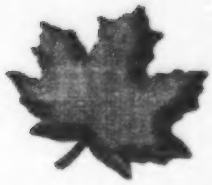

Tax Expenditures and Evaluations

2001

Department of Finance Canada
Ministère des Finances Canada

101-06595/

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Price: $16.00 (including GST)

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Cette publication est également disponible en français.

Cat No.: F1-27/2001E
ISBN 0-660-18604-7

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PREFACE

As announced in 2000, the Tax Expenditures report is now separated into two documents. This document, *Tax Expenditures and Evaluations*, is being published on an annual basis. It provides estimates and projections for broadly defined tax expenditures as well as descriptive papers on tax expenditures.

This year's edition includes a paper entitled "Present-Value Tax Expenditure Estimates of Tax Assistance for Retirement Savings." This analysis was prepared in response to a request from the Auditor General for alternative estimates that would show the lifetime cost to the government of contributions made in a given year to tax-assisted retirement savings (TARS) plans. In contrast, the tax expenditure estimates for TARS plans published in previous editions of this document are measured on a cash-flow basis. These estimates capture the loss of tax revenue in a given year associated with contributions and withdrawals in that year as well as foregone tax revenue on accumulated investment income on all past contributions. The two sets of estimates provide complementary information and both will be presented in this document, starting with this edition.

The companion document, *Tax Expenditures: Notes to the Estimates/Projections*, was published last year. It should be used as a reference document by readers who wish to know more about how the tax expenditures/projections are calculated or by readers who seek information on the objectives and descriptions of particular tax expenditures. New tax expenditures are described in the relevant section of this document.

Part 1

TAX EXPENDITURES: ESTIMATES AND PROJECTIONS

ESTIMATES AND PROJECTIONS OF TAX EXPENDITURES

While there is agreement on the conceptual definition of tax expenditures, there is no widely accepted operational methodology for estimating them. A range of methodologies exists internationally, some restrictive, others very broad. The broadest of the available options is to estimate tax expenditures as all deviations from a benchmark tax system. Typically, these deviations take the form of exemptions, deductions, rate reductions, rebates, credits, deferrals and carry-overs.

The approach used in this document is to provide as much information as possible to the reader by reporting any deviation from a very basic benchmark system. This allows the reader to decide whether or not a particular item qualifies as a tax expenditure. These deviations from the tax system are reported in two parts: one includes a list of all items that could be considered tax expenditures under a very broad definition; all other deviations from the benchmark tax system are reported as memorandum items.

Caveats

Care must be taken in interpreting the estimates and projections of tax expenditures in the tables for the following reasons.

- Tax expenditures are values of tax revenues forgone to achieve a variety of economic and social objectives. Whether or not the magnitudes of tax expenditures are appropriate depends upon an evaluation of the underlying social and economic policies. The values reported in the tables provide no information to permit such an evaluation.
- The cost of each tax measure is estimated separately, assuming that all other tax provisions remain unchanged. Many of the tax expenditures do, however, interact with each other, so the impact of several tax provisions at once cannot generally be calculated by adding up the estimates for each provision.
- The estimates assume all other factors remain unchanged (i.e., there is no allowance for behavioural changes, consequential government policy changes or changes in aggregate economic activity in response to the change in the tax expenditure).
- In addition to these considerations, the projections are subject to forecast error and are "best efforts" that have the same degree of reliability as the variables that explain them.
- The federal and provincial income tax systems interact with each other to various degrees. As a result, changes to tax expenditures in the federal system may have consequences for provincial tax revenues. In this publication, however, any such provincial effects are not taken into account – that is, the tax expenditure estimates address strictly the federal tax system.
- In the case of the harmonized sales tax in effect in Nova Scotia, New Brunswick, and Newfoundland and Labrador, only the federal cost of the tax expenditures is reported.

It should also be noted that, on occasion, the estimated or projected change in the value of a tax expenditure in this report does not coincide with the fiscal impact of a measure estimated in the budget. For example, this report shows that the cost of the partial inclusion rate for capital gains increased by $1 billion between 2000 and 2001. This increase is due to the reduction in the inclusion rate from three-quarters to two-thirds announced in the 2000 budget and the subsequent reduction to 50 per cent announced in the October 2000 Economic Statement and Budget Update. However, the economic statement estimated that together these two changes would cost only $300 million more for that same period. For a defined set of transactions, the reductions in the capital gains inclusion rate *raise* tax expenditures and *lower* budgetary revenues by the same amount. But the lower inclusion rate is expected to induce additional realizations, which increases both revenue and the tax expenditure. In other words, the rate reduction and the additional realizations have offsetting impacts on budgetary revenues (estimated in the budget) while they both raise the tax expenditure estimate (reported in this document).

A second example is the change in the partial exemption of scholarship, fellowship and bursary income that was also announced in the 2000 budget. The cost of this change was estimated at $30 million for the 2000 tax year. In contrast, the associated tax expenditure provided in this document shows an increase of only $21 million in 2000 compared to the previous year (to $27 million from $6 million). In this case, the apparent disparity is largely a matter of presentation. The total cost of this measure shown in the budget is spread over two or more categories in the *Tax Expenditures* report. The 2000 budget estimate of $30 million consists of the additional $21 million that will be claimed by students and a further $9 million that will either be carried forward or transferred to parents and claimed by them. These amounts are shown separately in the *Tax Expenditures* report.

WHAT'S NEW IN THE 2001 REPORT

The October 2000 Economic Statement and Budget Update, as well as other announcements during the past year, made a number of changes which affect the value of tax expenditures. Of particular note are the changes in both personal and corporate tax rates that determine the benchmark against which tax expenditures are measured. These rate changes, therefore, affect a large number of tax expenditures. A tax-rate reduction lowers the value of tax expenditures in the year the change is introduced but this is generally followed by growth in their value over time in line with increases in the size of incomes. These changes, together with others that affect specific tax expenditures, are described below.

Personal Income Tax

Reduction of personal income tax rates effective January 1, 2001

- The 17-per-cent rate was reduced to 16 per cent.
- The 24-per-cent middle tax rate – reduced from 26 per cent in the 2000 budget – was reduced further to 22 per cent.
- The 29-per-cent top tax rate was reduced to 26 per cent on incomes between about $60,000 and $100,000.
- The top tax rate of 29 per cent applies to incomes in excess of $100,000.
- The deficit-reduction surtax was eliminated.

Increased assistance for those who need it most

- Effective July 2001, the Canada Child Tax Benefit for low- and middle-income Canadians increased by an additional $100 per child over the $200-per-child increase in the 2000 budget. Combined with indexation, these increases will bring the maximum benefits for the first child to more than $2,500 by 2004.
- Effective January 2001, the disability tax credit amount was raised to $6,000 from $4,293.
- Effective January 2001, the credit amount for caregivers of dependent relatives who are elderly, infirm or disabled was raised to $3,500 from $2,386.

Enhancement of measures to reward entrepreneurship and innovation

- The capital gains inclusion rate reduced from three-quarters to two-thirds on February 28, 2000 – was cut further to one-half on October 18, 2000. Consistent with this change, the deduction for employee stock options was increased from one-third to one-half.
- Tax-free rollovers were expanded and made available to more businesses. The size of eligible investment increased to $2 million from $500,000 and the size of businesses eligible for the rollover increased to $50 million in assets from $10 million.

Increased assistance to students

- Effective January 1, 2001, the education amount on which the education credit is based doubled from $200 to $400 per month for eligible full-time students and from $60 to $120 per month for eligible part-time students.

New measures to encourage growth and job creation

- Effective January 1, 2001, self-employed individuals may deduct the portion of Canada Pension Plan (CPP) and Quebec Pension Plan (QPP) contributions that represents the employer's share (measure described in detail below).

- A temporary investment tax credit is provided at a rate of 15 per cent for specified mineral exploration expenses incurred in Canada pursuant to a flow-through share agreement. The flow-through share investor will be able to use this tax credit to reduce federal tax otherwise payable on eligible expenses incurred prior to 2004 (measure described in detail below).

Political contribution tax credit

- For 2000 and subsequent years, the political contribution tax credit is earned at a rate of 75 per cent on the first $200 contributed (previously $100), 50 per cent on the next $350 (previously $450) and 33 1/3 per cent on the next $525 (previously $600). The maximum credit is $500 and is available when the taxpayer has contributed $1,075.

Business Income Tax

Legislated timetable for rate reductions

- The October 2000 Economic Statement and Budget Update set out a timetable for fulfilling the government's commitment to reduce, by 2004, the federal corporate income tax on business income not currently eligible for special tax treatment, from 28 to 21 per cent.[1] Specifically, the federal corporate income tax rate, which was reduced by one percentage point from 28 to 27 per cent, effective January 1, 2001, as part of the February 2000 budget, will be further reduced by two points for each of the next three years to 21 per cent in 2004.

Reduced capital gains inclusion rate

- The capital gains inclusion rate – reduced from three-quarters to two-thirds on February 28, 2000 – was cut further to one-half on October 18, 2000.

[1] This lower rate does not apply to mutual fund corporations, mortgage investment corporations, investment corporations, small business and Canadian manufacturing and processing income, and investment income that benefits from refundable tax provisions. Nor does the reduction apply to income from non-renewable natural resource activities. The government is consulting on options to extend the lower income tax rate to the resource sector while at the same time improving the tax structure.

Political contribution tax credit

- For 2000 and subsequent years, the political contribution tax credit is earned at a rate of 75 per cent on the first $200 contributed (previously $100), 50 per cent on the next $350 (previously $450) and 33 1/3 per cent on the next $525 (previously $600). The maximum credit is $500 and is available when the corporation has contributed $1,075.

Non-deductibility of advertising expenses in foreign media

- Pursuant to the Canada-U.S. agreement of June 3, 1999, expenses for advertisements published in issues of periodicals after May 2000 that contain at least 80 per cent original editorial content are fully deductible, and advertising expenses in other periodicals are 50 per cent deductible. Previously, the deduction of such advertising expenses was precluded to the extent that the expenses were incurred for advertisements directed at the Canadian market in periodicals that did not meet certain Canadian ownership criteria.

Surtax on the profits of tobacco manufacturers

- Tobacco manufacturers are subject to a special surtax on their profits. The surtax rate has been increased from 40 per cent to 50 per cent of the Part I tax on profits from tobacco manufacturing, effective April 6, 2001.

DESCRIPTION OF NEW TAX EXPENDITURES

Two tax provisions have been introduced since the companion document, *Tax Expenditures: Notes to the Estimates/Projections,* was last published. They are:

Employment

Canada and Quebec pension plan deduction for the self-employed

Objective: This measure ensures that self-employed individuals are not disadvantaged relative to an owner-operator who is also an employee of the corporation. (*Economic Statement and Budget Update,* October 2000)

Under the Canada Pension Plan and Quebec Pension Plan (C/QPP), self-employed individuals are required to pay both the employer and employee portions of C/QPP contributions. As of January 1, 2001, self-employed individuals are permitted to deduct the portion of C/QPP contributions that represents the employer's share.

Small Business

Federal tax credit for flow-through share investors

Objective: To promote mineral exploration activity, particularly in rural communities across Canada that depend on mining. (*Economic Statement and Budget Update*, October 2000)

This temporary investment tax credit is available to individuals (other than trusts) at a rate of 15 per cent of specified surface "grass root" mineral exploration expenses incurred in Canada pursuant to a flow-through share agreement. The flow-through share investor will then be able to use this tax credit to reduce federal tax otherwise payable. This new credit will apply to specified expenses incurred by an individual pursuant to a flow-through share agreement made after October 17, 2000, in respect of expenses incurred by the corporation after that day and before 2004. This non-refundable credit will reduce the cumulative Canadian exploration expense pool for years following the year in which it is claimed.

THE TAX EXPENDITURES

Tables 1 to 3 provide tax expenditure values for personal income tax, corporate income tax and the goods and services tax (GST/HST) for the years 1996 to 2003.

Estimates and projections are developed using the methodology set out in Chapter 1 of the companion document, *Tax Expenditures: Notes to the Estimates/Projections*.[2] In this case, however, the economic variables used to develop the projections are based on the private sector average forecast presented in the May 2001 Economic Update.

Personal income tax expenditures are grouped according to functional categories. This grouping is provided solely for presentational purposes and is not intended to reflect underlying policy considerations.

All estimates are reported in millions of dollars. The letter "S" indicates that the cost is less than $2.5 million while "n.a." signifies that data are not available. The inclusion in the report of items for which estimates are not available is warranted given that the report is designed to provide information on the type of assistance delivered through the tax system even if it is not always possible to provide a quantitative estimate.

Work is continuing to obtain quantitative estimates where possible. For example, in the past, data were not available on the tax expenditure provided to registered charities and non-profit organizations (NPOs), since they did not file a tax return. However, NPOs have been required since January 1, 1993, to submit information returns to the Canada Customs and Revenue Agency (CCRA) if their income exceeds $10,000 or their assets exceed $200,000. With a number of years of data from the NPO returns now available, it has become possible to produce a tax expenditure estimate for NPOs for the first time. As this is not the case for registered charities, the heading "Non-Taxation of Registered Charities and Other Non-Profit Organizations" has now been broken down in the 2001 publication.

A further example is Oil Sands Tax Expenditures. A more detailed examination of this subject has been undertaken and is available in working paper 2001-17, "Oil Sands Tax Expenditures," on the Department of Finance Web site.[3] The results in this study supplement the analysis reported on pages 75-81 in the 2000 *Tax Expenditures: Notes to the Estimates/Projections* document.

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[2] Available on the Department of Finance Web site at http://www.fin.gc.ca.

[3] Department of Finance Web site: http://www.fin.gc.ca/activty/wp-dt/2001-17e.html.

Table 1
Personal income tax expenditures*†

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
				($ millions)				
Culture and recreation								
Deduction for clergy residence	58	58	55	55	53	50	50	50
Deduction for certain contributions by individuals who have taken vows of perpetual poverty	S	S	S	S	S	S	S	S
Write-off of Canadian art purchased by unincorporated businesses	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Assistance for artists	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deduction for artists and musicians	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of capital gains on gifts of cultural property	n.a.	7	11	11	10	7	7	7
Education								
Tuition fee credit[1]	210	240	260	260	260	225	230	240
Education credit[2]	55	77	120	120	115	200	205	210
Education and tuition fee credits transferred[3,4]	260	300	335	340	345	460	475	485
Carry-forward of education and tuition fee credits[5]	–	–	10	75	145	255	320	380
Student loan interest credit[6]	–	–	46	45	45	42	42	42
Registered education savings plans (RESPs)[7]	35	32	33	43	71	98	130	160
Partial exemption of scholarship, fellowship and bursary income[8]	6	5	6	6	27	23	23	23
Deduction of teachers' exchange fund contributions	S	S	S	S	S	S	S	S

* **The elimination of a tax expenditure would not necessarily yield the full tax revenues shown in the table. See the companion document, *Tax Expenditures: Notes to the Estimates/Projections*, published in 2000 and also available on the Department of Finance Web site (http://www.fin.gc.ca) for a discussion of the reason for this.**

† Budget 2000 fully indexed, effective January 1, 2000, those parameters that were previously only partially indexed. The 2000 budget also introduced full indexation of the income threshold at which tax rates begin to apply. These measures represent a change in the benchmark tax system and, consequently, there is no tax expenditure associated with indexation.
The *Economic Statement and Budget Update* of October 2000 reduced all personal income tax rates and eliminated the deficit reduction surtax, effective January 1, 2001. These rate reductions lower the value of exemptions and deductions, as well as those non-refundable tax credits whose values depend on a tax rate, in the year the change is introduced but this is generally followed by growth in their value over time in line with increases in the size of incomes.

Table 1
Personal income tax expenditures *(cont'd)*

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Employment								
Canada and Quebec pension plan deduction for the self-employed[9]	–	–	–	–	–	195	220	235
Deduction of home relocation loans	S	S	S	S	S	S	S	S
Non-taxation of allowances to volunteer firefighters[10]	4	4	–	–	–	–	–	–
Tax-free amount for emergency service volunteers[10]	–	–	14	14	14	14	14	14
Northern residents deductions	125	130	135	130	130	120	120	120
Overseas employment credit	44	37	62	62	63	63	63	63
Employee stock options[11]	125	200	215	215	285	415	420	430
Non-taxation of strike pay	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deferral of salary through leave of absence/sabbatical plans	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Employee benefit plans	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of certain non-monetary employment benefits	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Family								
Spousal credit[12,13]	1,190	1,155	1,100	1,180	1,290	1,250	1,300	1,350
Equivalent-to-spouse credit[12,13]	470	425	430	450	485	470	480	495
Infirm dependant credit[13,14]	7	7	7	7	7	10	10	10
Caregiver credit[13,14,15]	–	–	24	24	24	29	30	31
Canada Child Tax Benefit[13,16]	5,235	5,325	5,625	5,930	6,370	7,320	7,730	7,825
Deferral of capital gain through transfers to a spouse, spousal trust or family trust	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 1
Personal income tax expenditures (*cont'd*)

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Farming and fishing								
$500,000 lifetime capital gains exemption for farm property[17]	325	355	365	365	325	220	225	230
Net Income Stabilization Account[18]								
Deferral of tax on government contributions	110	93	76	93	83	76	76	76
Deferral of tax on bonus and interest income	18	22	30	35	40	39	43	47
Taxable withdrawals	-33	-37	-60	-99	-100	-100	-100	-100
Deferral of income from destruction of livestock	S	S	S	S	S	S	S	S
Deferral of income from grain sold through cash purchase tickets[19]	-30	6	12	51	22	22	22	22
Deferral through 10-year capital gain reserve[17]	S	9	S	S	S	S	S	S
Deferral of capital gain through intergenerational rollovers of family farms	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Exemption from making quarterly tax instalments	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Cash basis accounting	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Flexibility in inventory accounting	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Federal-provincial financing arrangements								
Quebec abatement	2,410	2,560	2,730	2,860	3,000	2,900	3,015	3,175
Transfers of income tax room to provinces	10,240	11,215	12,105	12,920	13,575	13,140	13,660	14,385
General business and investment								
Partial inclusion of capital gains[20]	655	925	935	940	1,475	2,455	2,345	2,270
Deduction of limited partnership losses	205	185	110	120	125	125	130	135
Investment tax credits	39	24	25	26	26	27	27	27
Deferral through five-year capital gain reserve[17, 21]	12	17	28	19	16	11	11	11
Deferral through capital gains rollovers[22]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deferral through billed-basis accounting by professionals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deduction of accelerated tax depreciation[23]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
$1,000 capital gains exemption on personal-use property[24]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
$200 capital gains exemption on foreign exchange transactions	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taxation of capital gains upon realization	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 1
Personal income tax expenditures (*cont'd*)

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Health								
Non-taxation of business-paid health and dental benefits[25]	1,490	1,625	1,650	1,700	1,690	1,560	1,575	1,585
Disability tax credit[13,26]	265	270	265	265	305	385	390	390
Medical expense credit[13,27]	330	355	405	430	460	465	505	550
Medical expense supplement for earners[13,28]	–	39	42	47	51	63	66	69
Income maintenance and retirement								
Non-taxation of guaranteed income supplement and spouse's allowance benefits[29]	300	290	290	275	270	260	270	280
Non-taxation of social assistance benefits[29]	560	455	395	350	330	295	285	275
Non-taxation of workers' compensation benefits	620	630	620	610	610	570	570	570
Non-taxation of amounts received as damages in respect of personal injury or death	18	18	17	17	17	15	15	15
Non-taxation of veterans' allowances, civilian war pensions and allowances, and other service pensions (including those from Allied countries)	3	S	S	S	S	S	S	S
Non-taxation of veterans' disability pensions and support for dependants[30]	155	155	155	155	150	140	140	140
Treatment of alimony and maintenance payments[31]	250	240	215	195	185	175	175	175
Age credit[13]	1,320	1,350	1,350	1,310	1,310	1,265	1,305	1,345
Pension income credit	365	385	405	405	405	385	395	405
Saskatchewan Pension Plan	S	S	S	S	S	S	S	S
Registered retirement savings plans (RRSPs)								
Deduction for contributions[32]	5,940	6,635	6,560	6,695	6,985	6,765	7,265	7,795
Non-taxation of investment income[33]	3,095	3,070	3,150	4,190	3,945	4,290	4,740	5,235
Taxation of withdrawals	-2,190	-2,425	-2,795	-3,030	-3,290	-3,185	-3,475	-3,785
Net expenditure[34]	6,845	7,280	6,915	7,855	7,640	7,870	8,530	9,245

Table 1
Personal income tax expenditures (*cont'd*)

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
				($ millions)				
Registered pension plans (RPPs)								
Deduction for contributions[32]	4,930	5,170	4,490	4,530	4,420	4,005	4,055	4,105
Non-taxation of investment income[33]	8,015	8,305	8,200	10,645	9,280	9,325	9,575	9,805
Taxation of withdrawals[32]	-4,905	-5,540	-5,985	-6,605	-7,090	-7,140	-7,905	-8,760
Net expenditure[34]	8,040	7,935	6,705	8,570	6,610	6,190	5,725	5,150
Supplementary Information:								
Present-value of tax assistance to RRSPs and RPPs[35,36]	7,420	7,630	7,125	7,170	7,290	6,880	7,185	7,485
Deferred profit-sharing plans	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of RCMP pensions/compensation in respect of injury, disability or death[37]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of up to $10,000 of death benefits	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of investment income on life insurance policies[38]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Small business								
$500,000 lifetime capital gains exemption for small business shares[17]	475	545	650	655	565	375	380	385
Deduction of allowable business investment losses[17,39]	74	56	61	63	64	60	61	63
Labour-sponsored venture capital corporations credit[40,41]	91	79	130	185	260	260	260	260
Deferral through 10-year capital gain reserve[17,21]	-5	13	13	7	6	5	5	5
Rollovers of investments in small businesses[42]	–	–	–	–	125	125	125	125
Federal tax credit for flow-through share investors[43]	–	–	–	–	–	38	44	68

Table 1
Personal income tax expenditures (*cont'd*)

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Other items								
Non-taxation of capital gains on principal residences[44]								
Partial inclusion rate[17]	1,260	1,335	980	1,170	1,025	805	805	805
Full inclusion rate	1,675	1,775	1,305	1,565	1,570	1,615	1,615	1,615
Non-taxation of income from the Office of the Governor General	S	S	S	S	S	S	S	S
Assistance for prospectors and grubstakers	S	S	S	S	S	S	S	S
Charitable donations credit[45]	1,120	1,180	1,300	1,310	1,310	1,290	1,320	1,350
Reduced inclusion rate for capital gains arising from donations of ecologically sensitive land[46]	–	–	–	–	n.a.	n.a.	n.a.	n.a.
Reduced inclusion rate for capital gains arising from certain charitable donations[47]	–	6	6	13	19	26	–	–
Political contribution credit	11	16	10	10	10	11	11	11
Special tax computation for certain retroactive lump-sum payments[48]	10	10	10	10	10	10	10	10
Non-taxation of income of Indians on reserves	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of gifts and bequests	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Memorandum items								
Non-taxation of lottery and gambling winnings[49,50]	1,380	3,290	4,245	4,240	4,195	3,855	3,905	3,930
Non-taxation of specified incidental expenses	5	4	4	5	5	4	4	4
Non-taxation of allowances for diplomats and other government employees posted abroad	8	8	8	8	7	7	7	7
Child care expense deduction[51]	420	405	435	430	435	390	390	390
Attendant care expense deduction	S	S	S	S	S	S	S	S
Moving expense deduction[52]	64	61	76	78	78	73	73	73
Deduction of carrying charges incurred to earn income	590	580	750	780	800	770	815	855
Deduction of meals and entertainment expenses	130	86	86	88	88	82	82	82
Deduction of farm losses for part-time farmers	57	58	59	59	58	54	54	54
Farm and fishing loss carry-overs	10	9	8	8	8	7	7	7
Capital loss carry-overs	160	175	145	145	145	125	130	135
Non-capital loss carry-overs	100	86	98	100	100	92	94	97

Table 1
Personal income tax expenditures (*cont'd*)

	Estimates			Projections				
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Logging tax credit	$	$	$	$	$	$	$	$
Deduction of resource-related expenditures	170	175	150	155	155	145	150	155
Reclassification of flow-through shares[53]	36	40	17	21	25	23	23	23
Deduction of other employment expenses	585	620	685	700	705	665	685	705
Deduction of union and professional dues	510	525	540	560	565	525	540	560
Employment insurance								
Employment insurance contribution credit	1,260	1,405	1,340	1,275	1,215	1,095	1,095	1,075
Non-taxation of employer-paid premiums	2,610	2,935	2,795	2,700	2,540	2,210	2,215	2,160
Canada and Quebec Pension Plans[54]								
Canada/Quebec Pension Plan credit[55]	1,195	1,155	1,335	1,490	1,690	1,945	2,195	2,385
Non- taxation of employer-paid premiums	1,550	1,695	2,000	2,265	2,535	2,625	2,960	3,215
Foreign tax credit[56]	300	345	505	510	520	530	540	550
Dividend gross-up and credit	815	895	1,030	1,100	1,190	1,295	1,410	1,540
Supplementary low-income credit[57]	–	–	135	130	–	–	–	–
Basic personal credit[13,58]	17,885	18,165	18,120	18,965	20,255	19,575	20,265	20,940
Non-taxation of capital dividends	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:

[1] The 1997 budget extended this credit to most mandatory ancillary fees imposed by post-secondary institutions, beginning in 1997.

[2] The 1996 budget increased this credit from $80 to $100 per month, beginning in 1996. The 1997 budget increased it to $150 per month for 1997 and $200 per month thereafter. The 1998 budget allowed part-time students to claim a part-time education amount of $60 per month. The October 2000 *Economic Statement and Budget Update* increased the credit to $400 per month for full-time students and $120 per month for part-time students, effective January 1, 2001.

[3] The 1996 budget increased from $4,000 to $5,000 the limit on the transfer of these amounts, beginning in 1996.

[4] Changes in these estimates from last year's publication reflect improvements in the methodology used to calculate them. The increase from $345 million in 2000 to $460 million in 2001 is largely explained by the doubling of the education amount announced in the October 2000 *Economic Statement and Budget Update*. Since most students do not have sufficient income to use this increased amount, this significantly increases transfers to supporting relatives.

[5] The 1997 budget introduced this measure, effective for 1997 and subsequent years. It is assumed that tax filers will begin to claim the credits carried forward beginning the year after they are earned. The lower estimate for 1998 relative to last year's publication reflects lower than anticipated take-up of this measure in its first year. The increase after 2001 is largely due to the doubling of the education credit which increases the extent to which students carry forward these credits.

[6] The 1998 budget introduced this measure, effective for 1998 and subsequent years. The decrease in the projections relative to last year's publication reflects recently available 1998 income tax data on the take-up of this measure.

[7] The 1998 budget supplemented annual contributions to RESPs with a 20-per-cent grant, the Canada Education Savings Grant, beginning in 1998. While this enhancement does not represent a tax expenditure, it increases the cost of the tax expenditure to the extent that it encourages participation in the RESP program. The decrease in the projections relative to last year's publication reflect recently available data on RESPs.

[8] The 2000 budget raised the exemption for scholarship, fellowship and bursary income from $500 to $3,000 for students eligible for the education credit. In addition, for 2000 and later tax years, the tax expenditure reflects the additional funds made available to students under the Millennium Scholarship Fund.

[9] This measure was introduced in the October 2000 *Economic Statement and Budget Update*, effective 2001. The tax expenditure estimates the incremental cost of allowing self-employed individuals to deduct the employer share of their Canada/Quebec pension plan contributions paid for their own coverage, relative to a benchmark system in which no such deduction is provided. Prior to this measure, self-employed individuals could claim a non-refundable credit on this share of their Canada/Quebec pension plan contributions. As a result, the actual cost of the change is lower than given by the tax expenditure.

[10] The 1998 budget replaced the $500 tax-free allowance for volunteer firefighters with an exemption of up to $1000 for emergency service volunteers. The tax expenditure estimate for the emergency service volunteer exemption includes claims by firefighters after 1997.

[11] This tax expenditure reflects only the stock option deduction and not the deferral from income inclusion. The increase in this tax expenditure in 1997 reflects a 65-per-cent increase in the number of claimants. The 2000 budget increased the stock option deduction from one-quarter to one-third. The October 2000 *Economic Statement and Budget Update* further increased this deduction from one-third to one-half.

[12] The 1999 budget increased this tax credit by $675 for all taxpayers, beginning July 1, 1999.

[13] The 2000 budget introduced full indexation of this tax credit effective January 1, 2000.

[14] The October 2000 *Economic Statement and Budget Update* increased the amount on which this credit is based from $2,386 to $3,500 for 2001.

[15] The 1998 budget introduced this measure.

[16] The 1996 through 2000 budgets and the October 2000 *Economic Statement and Budget Update* increased this tax benefit. Payments made between January and December of the year are reported. The 2000 budget fully indexed the Canada Child Tax Benefit (CCTB) starting January 2000. The 2000 budget and the October 2000 *Economic Statement and Budget Update* scheduled increases above and beyond indexation for the CCTB base benefit in July 2000 and for the NCB supplement in July 2001. Despite these program enhancements, CCTB tax expenditure projections have fallen relative to last year's publication. This reflects the higher than expected income growth in 1998, the year on which this publication's projections are based. High income growth resulted in more families with children earning higher family net incomes, which in turn placed them in the income ranges at which benefits are reduced.

[17] The 2000 budget reduced the capital gains inclusion rate from three-quarters to two-thirds, effective February 28, 2000. The October 2000 *Economic Statement and Budget Update* further reduced the capital gains inclusion rate from two-thirds to one-half, effective October 18, 2000. The decline in this tax expenditure after 1999 reflects, in part, reductions to this inclusion rate.

[18] NISA data on this tax expenditure is available up to 2000. The deferral of tax on government contributions is highly volatile and, beyond 2000, is projected at its historical average. For the deferral of tax on bonus and interest income, the decline between 2000 and 2001 is due to the fall in tax rates.

[19] Until last year's publication, estimates of this tax expenditure were based on data provided by the Canadian Wheat Board, which included cash purchase tickets for wheat and barley. As of this year's publication, these estimates are based on Statistics Canada data, available up to 1999, which include cash purchase tickets for wheat, barley, oats, canola, flax and rye. Beyond 1999 the projections are historical averages because of the volatility of this series.

[20] The increase in the value of this tax expenditure for 1997 reflects a 33-per-cent increase in the amount of taxable capital gains reported in that year and a 30-per-cent increase in the number of claimants. The 2000 budget reduced the capital gains inclusion rate from three-quarters to two-thirds, effective February 28, 2000. The

October 2000 *Economic Statement and Budget Update* further reduced the capital gains inclusion rate from two-thirds to one-half, effective October 18, 2000. Increases in this tax expenditure after 1999 reflect these reductions to the capital gains inclusion rate as well as anticipated increases in capital gains realizations resulting from changes to this measure.

[21] This tax expenditure is highly volatile. It is projected at its historical average.

[22] This tax expenditure does not include measures in the 2000 budget or the October 2000 *Economic Statement and Budget Update* for rollovers of eligible small business investments.

[23] This tax expenditure includes the deduction of scientific research and experimental development expenditures. Data are not available to estimate this tax expenditure with precision.

[24] The 2000 budget amended the rules so that the $1,000 deemed adjusted cost base, and deemed proceeds of disposition for personal-use property will not apply if the property is acquired after February 27, 2000, as part of an arrangement in which the property is donated as a charitable gift.

[25] The 1998 budget allowed unincorporated owner-operators to deduct premiums for supplementary health care coverage against their business income to a maximum amount, beginning in 1998. Statistics Canada and Canadian Life and Health Insurance Association data used to estimate their tax expenditure are available up to 1998 and 1999 respectively.

[26] The 2000 budget enhanced the disability tax credit (DTC) by extending eligibility for the DTC to individuals requiring extensive therapy, and by expanding the list of relatives to whom the DTC can be transferred. The 2000 budget also provided a supplement of up to $500 for children eligible for the DTC. The October 2000 *Economic Statement and Budget Update* increased the amount on which the DTC is based from $4,293 to $6,000 effective 2001.

[27] The 1997 budget broadened this credit to cover additional expenses, beginning in 1997. The 1999 budget further broadened this credit for the care and education of persons with disabilities, beginning in 1999.

[28] This measure was introduced in the 1997 budget.

[29] The projected decline in this tax expenditure after 1997 reflects changes in the 1998 to 2000 budgets and the October 2000 *Economic Statement and Budget Update* to reduce tax rates on low-income individuals (e.g., increases in the personal amounts and the reduction in the low-income tax rate).

[30] Public Accounts data used for this tax expenditure are available up to 1999.

[31] The 1996 budget eliminated the income inclusion for recipients of child support payments, and disallowed the deduction to payers, for agreements made after April 30, 1997.

[32] Revisions in estimates for 1997 reflect a change in the calculation of effective average tax rates.

[33] Projected values for this tax expenditure are higher for 1999 than those provided in last year's publication due to higher-than-expected interest rates for that year. In addition, for other years, the estimates are lower due to lower-than-expected interest rates in those years.

[34] Net expenditure represents the total tax expenditure associated with this measure.

[35] These estimates are being introduced this year and will be provided in future reports. The present-value estimates reflect the lifetime cost of a given year's contributions. This definition is different from that used for the cash-flow estimates and thus the two sets of estimates are not directly comparable. Further information on how these estimates are calculated is contained in the paper "Present-Value Tax Expenditure for Tax Assisted Retirement Savings" contained in this report.

[36] The tax expenditure per dollar of contributions is relatively stable from 1997 to 2000, then it drops sharply in response to lower tax rates. This causes the total value of the tax expenditure to fall in 2001, despite a rise in contributions. By 2003, however, strong growth in contributions is projected to raise the value of the tax expenditure above its level in 2000.

[37] The amounts reported in previous years for this tax expenditure included taxable amounts and did not cover all non-taxable RCMP pensions. This tax expenditure cannot be estimated with precision.

[38] Although this measure does provide tax relief for individuals, it is implemented through the corporate tax system. See the corporate income tax expenditure section of this report for an estimate of the value of this tax expenditure.

[39] The fall between 2000 and 2001 reflects the reduction in the capital gains inclusion rate announced in the 2000 budget and in the October 2000 *Economic Statement and Budget Update*.

[40] The 1996 budget reduced this credit from 20 per cent to 15 per cent and the purchase amount eligible for the credit from $5,000 to $3,500 per year, for purchases made after March 5, 1996. The purchase amount eligible for the credit was increased to $5,000 in 1998, effective for 1998 and subsequent years.

[41] The decline in the value of this expenditure in 1997 reflects a decline in the number of claimants and in the average claim in that year, resulting from Budget 1996 changes to the credit. The increase in the value of this expenditure for 1998 reflects a 30-per-cent increase in the number of claimants and a 25-per-cent increase in the average claim in that year. The values of this tax expenditure in 1999 and 2000 are based on preliminary information on sales of shares of labour-sponsored venture capital corporations for those years. Projections assume sales remain constant after 2000.

[42] This provision was introduced in the 2000 budget. The October 2000 *Economic Statement and Budget Update* expanded this measure by increasing the size of small businesses eligible for the rollover, and by raising the eligible investment limit from $500,000 to $2 million.

[43] This measure was introduced in the October 2000 *Economic Statement and Budget Update*. This new non-refundable investment tax credit will be available to individuals (other than trusts) at the rate of 15 per cent of specified mineral exploration expenses incurred in Canada pursuant to a flow-through share agreement. The flow-through share investor will then be able to use this tax credit to reduce federal tax otherwise payable, and will be applicable to eligible expenses occurred atfer October 17, 2000 and before 2004. These estimates differ from those in the *Economic Statement and Budget Update* since tax expenditure estimates are based on the calendar year whereas the budget update estimates were on a fiscal year basis.

[44] The decline in this tax expenditure in 1998 reflects a decline in the volume of home sales and in the average home value. The decline in the partial inclusion rate projections after 1999 reflects the reduction in the capital gains inclusion rate from three-quarters to two-thirds, effective February 18, 2000, and from two-thirds to one-half, effective October 18, 2000.

[45] This tax expenditure includes both gifts to the Crown and donations to other charities, as they were treated equivalently in the ITA beginning in 1997.

[46] This measure was proposed in the 2000 budget. No data are currently available.

[47] This measure was introduced in the 1997 budget for a five-year experimental period and will be reviewed this year. The 1997 to 1999 figures are based on income tax data. Consistent with the methodology of tax expenditures, these estimates assume that the measure did not bring forth any incremental donations. They therefore do not measure the full fiscal cost of the measure. Consistent with the legislated expiration of the measure at the end of 2001, no amount is estimated for 2002 or 2003. The lower figures for tax years 2000 and 2001 relative to last year's publication reflect the October 2000 *Economic Statement and Budget Update* announcement that reduced the capital gains inclusion rate from two-thirds to one-half, effective October 18, 2000.

[48] This provision was introduced in the 1999 budget, effective for qualifying retroactive lump-sum payments received after 1994. Cost estimates for 1996-1998 reflect the costs associated with qualifying payments received in those years, even though claims have not been processed before 2000.

[49] This estimate assumes that the total amount of lottery and horse racing winnings would be included in income and subject to tax. However, there is some uncertainty regarding the proper benchmark tax system in this area. For example, if the benchmark system included taxation of winnings, it would also have to include a deduction for the purchase cost of tickets. A threshold below which winnings would not be taxable may also be necessary, due to the large administrative cost of taxing very small prizes. In addition, proceeds from the sale of lottery tickets are an important source of funds for provincial governments and not-for-profit organizations. As a result, there is already an element of taxation to lottery and gambling proceeds. This estimate is therefore included as a memorandum item only.

[50] The increase in this tax expenditure after 1996 reflects the recent availability of data on casino and video lottery winnings, which Statistics Canada began collecting starting with fiscal year 1997/98.

[51] The 1996 budget broadened eligibility criteria for claiming this deduction, beginning in 1996. The 1998 budget increased the maximum claim under this provision, and extended it to part-time students, beginning in 1998. The 2000 budget increased limits in respect of persons eligible for the Disability Tax Credit.

[52] The 1998 budget enhanced the moving expense deduction by including certain costs of maintaining a vacant former residence (including mortgage interest and property taxes) and other miscellaneous relocation expenses.

[53] This tax expenditure applies to a subset of resource-related deductions. Data was available for 1996 to 1999 on the volume of re-classified shares, and this data was used to calculate estimates. Due to volatility, the projections for 2000 to 2003 are based on a three-year historical average, with the decline between 2000 and 2001 resulting from the decline in average tax rates.

[54] The October 2000 *Economic Statement and Budget Update* introduced a measure, effective 2001, allowing self-employed individuals to deduct the employer share of their Canada/Quebec pension plan contributions paid for their own coverage. Prior to the introduction of this measure, self-employed individuals could claim a non-refundable credit on this share of their Canada/Quebec pension plan contributions. The decline in these projections relative to last year's publication reflects this change.

[55] Changes in these estimates from last year's publication reflect improvements in the methodology used to calculate them.

[56] The expected increase in this tax expenditure is in line with the historical trend.

[57] This measure was introduced in the 1998 budget. The 1999 budget extended this measure to all taxpayers, effective July 1, 1999. The 1999 budget increased the tax expenditures associated with the basic personal credit and the spousal/equivalent-to-spouse credits and eliminated the supplementary low-income credit.

[58] From 1996 through 1998, the basic personal credit was $6,456. The 1999 budget increased the basic personal credit by $675, effective July 1, 1999, raising the value of the credit to $7,131 (since this credit was implemented half-way through the year, the effective basic credit in the 1999 taxation year was $6,794, or half the proposed annual increase). The 2000 budget fully indexed this credit, effective January 1, 2000, raising the value of this credit to $7,231 for the 2000 taxation year and to $7,412 for the 2001 taxation year.

Table 2
Corporate income tax expenditures*†

	Estimates		Projections[1]					
	1996[2]	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Tax rate reductions								
Low tax rate for small businesses[3]	2,585	2,820	2,880	3,255	4,045	3,910	3,515	3,215
Low tax rate for manufacturing and processing (M&P)[4]	1,390	1,735	1,710	1,825	2,280	2,030	1,425	810
Low tax rate on general income of small businesses[5]	–	–	–	–	–	65	80	50
Low tax rate for credit unions[6]	41	41	39	43	48	46	41	36
Exemption from branch tax for transportation, communications, and iron ore mining corporations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Exemption from tax for international banking centres	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tax credits								
Investment tax credits								
Scientific research and experimental development investment tax credit	985	1,080	1,085	1,140	1,195	1,255	1,315	1,385
Atlantic investment tax credit[7]	130	66	105	110	115	120	125	135
Investment tax credits carried back	87	62	79	84	90	95	100	110
Investment tax credits claimed in current year but earned in prior years	725	645	730	775	825	880	935	995
Political contribution tax credit	S	S	S	S	S	S	S	S
Canadian film or video production tax credit	43	78	87	97	105	110	115	120
Film or video production services tax credit[8]	-	S	12	13	14	15	15	16

* **The elimination of a tax expenditure would not necessarily yield the full tax revenues shown in the table. See the document entitled *Tax Expenditures: Notes to the Estimates/Projections*, published in 2000 and available on the Department of Finance Web site (http://www.fin.gc.ca), for a discussion of the reasons for this.**

† The *Economic Statement and Budget Update* of October 2000 set out a timetable for fulfilling the government's commitment to reduce, by 2004, the federal corporate income tax on business income not currently eligible for special tax treatment, from 28 to 21 per cent. Including the corporate surtax, the tax rate used for the benchmark is reduced from 28.12 per cent for 2001 to 26.12 per cent for 2002, and 24.12 per cent for 2003. Since this measure represents a change in the benchmark tax system, there is no tax expenditure associated with this measure. This reduction in the benchmark rate reduces the value of exemptions, deductions and deferrals as well as non-refundable tax credits and tax reductions whose value depend on the benchmark rate

Table 2
Corporate income tax expenditures (*cont'd*)

	Estimates		Projections[1]					
	1996[2]	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Exemptions and deductions								
Partial inclusion of capital gains[9]	665	1,130	715	755	1,135	2,005	2,125	2,030
Royalties and mining taxes								
Non-deductibility of Crown royalties and mining taxes[10]	-385	-340	-405	-440	-1,075	-1,280	-1,155	-845
Resource allowance[10]	520	415	490	530	1,265	1,410	1,265	930
Earned depletion[11]	71	33	40	30	20	10	S	S
Deductibility of charitable donations	150	165	175	185	210	200	200	210
Deductibility of gifts to the Crown	20	19	14	15	20	19	18	19
Interest on small business financing loans	S	S	S	S	S	–	–	–
Non-deductibility of advertising expenses in foreign media	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of provincial assistance for venture investments in small business	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deferrals								
Accelerated write-off of capital assets and resource-related expenditures[12]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Allowable business investment losses[13]	35	26	34	33	30	25	26	26
Holdback on progress payments to contractors[14]	9	8	10	30	30	30	30	30
Available for use	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Capital gains taxation on realization basis	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Expensing of advertising costs[15]	18	47	47	48	52	53	55	58
Deductibility of contributions to mine reclamation and environmental trusts	S	S	S	S	S	S	S	S
Deductibility of countervailing and anti-dumping duties[16]	–	–	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deductibility of earthquake reserves[16]	–	–	3	5	5	5	5	5
Cash basis accounting	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Flexibility in inventory accounting	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deferral of income from grain sold through cash purchase tickets	3	S	-14	-7	-4	S	S	S
Deferral of income from destruction of livestock	S	S	S	S	S	S	S	S
Deferral through use of billed-basis accounting by professionals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 2
Corporate income tax expenditures (*cont'd*)

	Estimates		Projections[1]					
	1996[2]	1997	1998	1999	2000	2001	2002	2003
				($ millions)				
International								
Non-taxation of life insurance companies' world income	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Exemptions from non-resident withholding tax[17]								
Copyright royalties	22	24	25	26	27	29	30	32
Royalties for the use of, or right to use, other property	49	52	54	57	60	63	66	69
Interest on deposits	365	390	405	410	420	415	415	430
Interest on long-term corporate debt	690	730	760	765	785	775	780	805
Dividends	110	140	140	155	170	185	205	225
Management fees	22	23	24	25	26	28	29	30
Exemption from Canadian income tax of income earned by non-residents from the operation of a ship or aircraft in international traffic	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Other items								
Transfer of income tax room to provinces in respect of shared programs	715	860	895	935	1,215	1,250	1,255	1,330
Interest credited to life insurance policies	74	75	79	81	84	87	90	93
Non-taxation of registered charities	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of other non-profit organizations (NPO)[18]	92	86	89	94	100	105	105	105
Income tax exemption for provincial and municipal corporations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-taxation of certain federal Crown corporations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Aviation fuel excise tax rebate[19]	–	n.a.	n.a.	n.a.	n.a.	–	–	–
Surtax on the profits of tobacco manufacturers[20]	-66	-68	-75	-70	-70	-80	-85	-85
Resource sector tax rate[21]	–	–	–	–	–	n.a.	n.a.	n.a.
Temporary tax on the capital of large deposit-taking institutions[22]	-51	-55	-61	-63	-54	–	–	–
Memorandum items								
Refundable taxes on investment income of private corporations								
Additional Part I taxes[23]	-315	-500	-505	-520	-515	-510	-635	-800
Part IV tax	-1,030	-950	-965	-985	-1,035	-1,080	-1,120	-1,160
Dividend refund	1,510	1,740	1,765	1,805	1,875	1,895	1,955	2,025
Net expenditure	165	290	295	300	325	305	200	65

Table 2
Corporate income tax expenditures (*cont'd*)

	Estimates		Projections[1]					
	1996[2]	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Refundable capital gains for investment corporations and mutual fund corporations[24]	250	370	480	505	465	330	305	270
Loss carry-overs[25]								
Non-capital losses carried back	800	925	935	880	835	990	1,085	1,070
Non-capital losses applied to current year	1,965	2,865	2,480	3,165	3,390	2,915	2,945	3,015
Net capital losses carried back	41	86	80	90	95	85	85	85
Net capital losses applied to current year	285	350	295	315	330	300	295	280
Farm losses applied to current year	8	19	16	17	18	19	19	20
Deduction of meals and entertainment expenses	225	255	255	270	290	280	280	280
Large corporations tax								
Threshold	530	545	560	570	580	595	605	615
Exempt corporations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Patronage dividend deduction[26]	215	180	245	275	340	320	310	315
Logging tax credit[27]	30	30	28	46	48	49	50	55
Deductibility of provincial royalties (joint venture payments) for the Syncrude project (remission order)[28]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deductibility of royalties paid to Indian bands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Non-resident-owned investment corporation refund[29]	160	165	170	190	210	210	210	210
Investment corporation deduction	S	S	S	S	4	3	S	S
Deferral through capital gains rollovers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deduction for intangible assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tax exemption on income of foreign affiliates of Canadian corporations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:

[1] Unless otherwise indicated in the footnotes, changes in the projections from those in last year's edition of this document result from changes in the explanatory economic variables upon which the projections are based.

[2] The 1996 figures are based on final data and may differ from the figures in last year's edition of this document, which were based on preliminary data.

[3] The increase in the tax expenditure from 1998 to 2000 is attributable to a large increase in projected taxable income during this period. The decline in the tax expenditure starting in 2001 results from the reductions in the benchmark rate.

[4] The increase from 1996 to 1997 reflects an increase in the level of M&P profits. The decline in the tax expenditure starting in 2001 results from the reductions in the benchmark rate.

[5] This measure was announced in the 2000 budget and is effective January 1, 2001. The lower rate on general income of small businesses and the change in the benchmark federal tax rate effective January 1, 2001, only partially affect estimates for taxation year 2001 since many firms reporting income in the 2001 taxation year earned a portion of that income in the 2000 calendar year, before the rate reductions were introduced.

[6] The estimates are lower after 2000 as a result of the phased-in reductions in the general corporate income tax rate.

[7] The decrease in 1997 reflects a lower level of earned investment tax credit.

[8] This measure was introduced in 1997.

[9] The increase in the tax expenditure from 1996 to 1997 reflects an increase in capital gains. The increase in 2000 and 2001 reflects the net effect of a projected increase in capital gains and the reduction in the capital gains inclusion rate from three-quarters to one-half during 2000.

[10] Estimates for the non-deductibility of Crown royalties and mining taxes and the resource allowance are highly dependent upon the level of activity in the resource industries. Major differences between the estimates prepared in 2000 and these estimates are due to higher prices for hydrocarbons (i.e. crude oil and natural gas) and increased production in 2000 and subsequent years. Improved data for prior years have also become available. Both series decline after 2001 to reflect the fact that hydrocarbon prices are expected to fall after reaching a peak in that year.

[11] The lower value for 1997 reflects new data received since the publication of the previous report. Additions to depletion pools were eliminated as of January 1, 1990. The declining value of this tax expenditure reflects the fact that these pools are being drawn down, albeit subject to any limitations imposed by the successor rules.

[12] This tax expenditure consists of the fast write-off of certain capital assets, including capital equipment used for scientific research and experimental development, of resource exploration and development expenditures and of energy conservation and efficiency equipment. See the document entitled *Tax Expenditures: Notes to the Estimates/Projections*, published in 2000 and available on the Department of Finance Web site (http://www.fin.gc.ca), for an explanation of why no figures have been calculated.

[13] The amount of this tax expenditure can fluctuate from year to year depending on the amount of current-year losses and the availability of income against which to apply these losses.

[14] The amount of this tax expenditure can fluctuate significantly from year to year depending primarily upon the level of construction activity.

[15] The amount of this tax expenditure can fluctuate significantly from year to year depending upon advertising expenses claimed.

[16] This measure was introduced in 1998.

[17] Estimates were computed on the basis of an analysis of payments to non-residents and withholding tax collections available for 1999, the latest year for which complete data were available. Estimates in previous publications were based on similar data for the years 1992-94. Figures for 1996-98 and 2000-2003 are, respectively, backward and forward projections based on the 1999 estimates. These estimates and projections are based on the benchmark assumption that no behavioral response would occur after the hypothetical removal of existing withholding tax exemptions. This assumption is particularly difficult to sustain for this type of tax, as indicated in the document entitled *Tax Expenditures: Notes to the Estimates/Projections*, published in 2000 and available on the Department of Finance Web site (http://www.fin.gc.ca). Consequently, the amounts shown in the table should not be regarded as estimates and projections of the revenue gain that would be realized from the hypothetical removal of the listed withholding tax exemptions.

[18] Data were previously unavailable for this expenditure. With a number of years of data now available from the NPO return (introduced from January 1, 1993), it has become possible to produce a tax expenditure estimate for NPOs for the first time.

[19] This measure was effective for the years 1997 to 2000 inclusive.

[20] The increase in this tax expenditure from 2000 to 2002 results from the increase in the tobacco manufacturers' surtax from 40 per cent to 50 per cent of the Part I tax on profits from tobacco manufacturing, effective April 6, 2001.

[21] Corporate income earned in the resource sector is taxed at 29.12%. The benchmark federal tax rate dropped to 28.12% on January 1, 2001, and will decline to 26.12%, 24.12%, and 22.12% on January 1, 2002, 2003, and 2004, respectively. The rate reductions will apply only to sectors that did not benefit from special tax preferences. The resource sector benefits from a number of such preferences (accelerated exploration and development expenses and fast write-offs for certain capital assets, the structure of the resource allowance) that act in conjunction to reduce the effective tax rate on this sector below comparable rates in other sectors, including manufacturing. Accurate measurement of estimates for the tax expenditures would require taking these interactions into account but this is not possible because of methodology and data constraints.
The Department has initiated consultations on options to extend the lower tax rate to this sector while at the same time improving the tax structure.

[22] This measure was first introduced in the 1995 budget and extended in subsequent budgets. After a review of capital taxes levied on financial institutions, the temporary tax was not extended beyond its scheduled expiry date of October 31, 2000.

[23] This tax expenditure includes the additional 6 2/3 per cent refundable tax on investment income as well as, for years after 2000, the Part I tax paid on investment income in excess of the benchmark rate. The increase in this expenditure for 2002 and 2003 results from the increase in the difference between the Part I tax on investment income and the benchmark rate.

[24] New estimates are higher than previous publications, due to the availability of new data. The increase in the 1997 tax expenditure is due to a significant increase in the capital gains dividend distribution. The estimates are lower after 2000 to take into account the phased-in reduction in the general corporate income tax rate and the reduction in the capital gains inclusion rate.

[25] The impact of loss carry-overs can fluctuate significantly from year to year depending upon the amount of current and prior years' losses and the availability of income against which to apply these losses.

[26] Patronage dividends are somewhat discretionary and vary from year to year. The lower tax expenditure in 1997 reflects lower patronage dividend distributions. The estimates are lower after 2000 to take into account the phased-in reductions in the general corporate income tax rate.

[27] The change between last year's and this year's estimates reflects improvements in the underlying data and in the forecast of economic activity.

[28] The cost of the Syncrude Remission Order ("Order Respecting the Remission of Income Tax for the Syncrude Project," P.C. 1976-1026, May 6, 1976 [C.R.C. 1978 Vol. VII, c. 794]) has not been estimated for this edition. The costs of this particular remission order are now published annually in the Public Accounts of Canada (ISBN 0-660-177792-7).

[29] The change between last year's and this year's estimates reflects improvements in the underlying data used to estimate the cost of the refund.

Table 3
GST tax expenditures*

	Estimates				Projections			
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Zero-rated goods and services								
Basic groceries[1]	2,650	2,815	2,925	3,065	3,245	3,420	3,610	3,785
Prescription drugs[1]	210	220	230	240	255	270	285	300
Medical devices[1]	85	90	90	95	100	105	115	120
Agricultural and fish products and purchases	S	S	S	S	S	S	S	S
Certain zero-rated purchases made by exporters	S	S	S	S	S	S	S	S
Non-taxable importations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Zero-rated financial services	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tax-exempt goods and services								
Long-term residential rent[1]	975	1,025	1,065	1,110	1,160	1,235	1,310	1,365
Health care services[1]	490	520	545	570	595	630	665	700
Education services (tuition)[1]	245	260	270	280	300	315	335	350
Child care and personal services[1]	120	125	130	135	145	150	160	165
Legal aid services[2]	30	20	15	15	15	15	20	20
Ferry, road and bridge tolls[1]	5	5	5	5	5	5	5	5
Municipal transit[1]	70	70	75	75	80	85	90	95
Exemption for small business	110	120	125	135	140	150	160	165
Quick method accounting	150	165	170	180	195	200	210	225
Water and basic garbage collection services[1]	65	70	70	75	75	80	85	90
Domestic financial services	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Certain supplies made by non-profit organizations	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

*** The elimination of a tax expenditure would not necessarily yield the full tax revenues shown in the table. See the companion document *Tax Expenditures: Notes to the Estimates/Projections* published in 2000 and available on the Department of Finance Web site (http://www.fin.gc.ca), for a discussion of the reasons for this.**

Table 3
GST tax expenditures (*cont'd*)

	Estimates				Projections			
	1996	1997	1998	1999	2000	2001	2002	2003
	($ millions)							
Tax rebates								
Housing rebate[3]	370	510	490	540	560	590	650	700
Rebates for new residential rental property[4]	n.a.	n.a.	n.a.	n.a.	10	35	45	45
Rebates for book purchases made by qualifying public institutions[5]	S	30	30	35	35	40	40	40
Rebate for foreign visitors on accommodations[6]	60	65	75	80	80	85	85	90
Rebates for municipalities[7]	470	490	510	620	620	620	620	620
Rebates for hospitals[7]	235	230	265	325	325	325	325	325
Rebates for schools[7]	275	275	310	345	345	345	345	345
Rebates for universities[7]	100	105	115	140	140	140	140	140
Rebates for colleges[7]	45	45	55	60	60	60	60	60
Rebates for charities[8]	155	150	170	190	200	215	225	245
Rebates for non-profit organizations	50	40	45	50	55	55	60	65
Tax credits								
Special credit for certified institutions	n.a.	–	–	–	–	–	–	–
GST credit	2,850	2,895	2,860	2,900	2,805	2,875	2,935	2,990
Memorandum items								
Meals and entertainment expenses[9]	105	105	110	115	125	130	135	140
Rebate to employees and partners	70	70	80	85	95	95	100	105
Sales of personal-use real property	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:

[1] The national GST model used to generate these estimates has been updated and is now based on the 1997 national input-output tables from Statistics Canada and the latest release of the national income and expenditure accounts. Moreover, technical improvements have been made to the model with respect to the measurement of the potential revenues arising from broadening of the tax base. In some instances, these changes have resulted in significant revisions to the tax expenditures.

[2] This tax expenditure was revised downward as a result of new administrative data.

[3] The housing rebate is based on information provided by Statistics Canada. The downward revision in the 1996 estimate was made to address a technical deficiency in the previous value. The rebate for subsequent years has been revised upward largely as a result of new information on housing prices.

[4] The new residential rental property rebate was introduced in April 2000.

[5] The book rebate was introduced in October 1996.

[6] The methodology for estimating this tax expenditure was derived as part of the review of the Visitors' Rebate Program conducted during 1997 and has been updated to reflect more recent information.

[7] Since the value of this tax expenditure is influenced by provincial budgetary decisions, the projected value of the tax expenditure for the relevant years is simply the value estimated for 1999. The amounts for 1999 were, in all cases, revised upward as a result of new administrative data for that year.

[8] This tax expenditure was revised upward as a result of new administrative data.

[9] The approach used to derive the tax expenditure figures is tightly integrated with the tax expenditure estimates reported for the personal and corporate tax system.

Part 2

TAX EVALUATION AND RESEARCH REPORT

PRESENT-VALUE TAX EXPENDITURE ESTIMATES OF TAX ASSISTANCE FOR RETIREMENT SAVINGS

1. INTRODUCTION

The Department of Finance Canada currently publishes annual estimates of the tax expenditure associated with tax-assisted retirement savings (TARS) programs. However, the Auditor General of Canada has asked the Department to develop an alternative set of estimates that present the net-present-value tax expenditure of contributions made to TARS programs in a given year. This paper first describes the methodology used for measuring the present-value tax expenditure for TARS programs and then provides estimates and projections for the period 1996 to 2003.

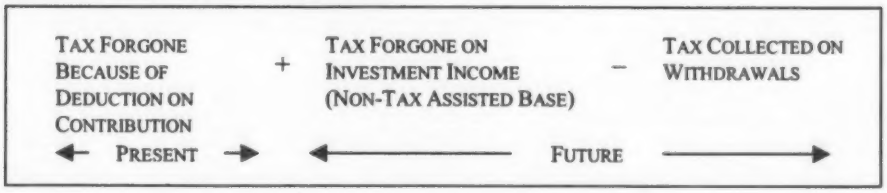
Background

Canada provides three tax-assisted programs for retirement savings: registered pension plans (RPPs), registered retirement savings plans (RRSPs) and deferred profit-sharing plans (DPSPs).

These programs benefit individuals in two ways. First, individuals receive a tax deferral on the amount they contribute to a tax-assisted plan. Second, any investment income earned on a contribution accrues tax-free. However, individuals have to pay taxes on both contributions and associated investment income when they withdraw funds from a tax-assisted plan.

For the Government, these programs have costs in terms of forgone revenue. As Figure 1 illustrates, for a given contribution, there is the tax forgone when the contribution is made (since it is deductible from total income). In addition, the Government forgoes the taxes that it would have received in the future on the investment income if the investment had been made in a non-tax-assisted vehicle. However, these costs are offset in part by the taxes the Government will receive in the future when withdrawals are made.

Figure 1
Lifetime Revenue Cost of a Contribution



Alternative Methods of Measuring the Tax Expenditure

Since there is a tax deferral component in TARS programs, there has been some debate over the appropriate method to measure the tax expenditure.

The Cash-Flow Method

Currently the Government uses a cash-flow method, which answers the following question: If the TARS program were removed today, what would be the estimated revenue impact in the current year? The estimated tax expenditure is arrived at in three steps. First, the Government calculates the value of all the deductions for contributions made in the current year. Second, it imputes the taxes that would have been paid on the investment income earned in TARS plans in the current year and adds that to the cost of the deductions. Third, it deducts from this total the taxes paid on the withdrawals from TARS plans in the current year.

While this method answers the question posed above, it has shortcomings in respect of a number of important issues. In particular, the size of the estimate depends directly on the maturity of the retirement savings system and the relative sizes of the working and retired populations. For example, in the early years of a pension system, contributions tend to be high relative to benefit payouts, whereas under a mature system total payouts will usually exceed total contributions. The estimate is also affected by demographic conditions. Currently, contributions are high relative to benefits because the baby boom generation is in its peak contribution years. Thus, for these two reasons, one could argue that the cash-flow estimates overstate the cost of providing tax assistance. The tax expenditure implied by these estimates may be expected to decline in the future as the pension system matures and members of the baby boom generation begin to draw down their savings.

The Present-Value Method

Another way of measuring the tax expenditure associated with TARS programs is to answer the question: What is the lifetime cost of all contributions made in a given year?[1] The present-value method answers a different question than the one answered by the cash-flow method and thus the estimates from the two methods are not directly comparable. The present-value method considers the net revenue forgone in today's dollars because of contributions made in a year. That is, it adds together the cost of the deduction incurred today for those contributions and the discounted cost of the non-taxation of the accrued investment income earned on those contributions, and then it subtracts the discounted revenue stream received when the contributions and the investment income are withdrawn.

This present-value method does not take into account the revenue forgone on past contributions. However, unlike the cash-flow method, it is not affected by demographic conditions or the maturity of the pension system. The present-value and cash-flow methods will not produce the same result under any demographic conditions.

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[1] The present-value approach was first put forward by Samuel Rae. However, unlike the estimates in this paper, which are for the lifetime cost of one year's contributions, Rae was proposing a means to estimate an annual tax expenditure of all past and present contributions to RRSPs. See Samuel A. Rae, Jr., "Registered Retirement Savings Plans as a Tax Expenditure," *Canadian Tax Journal*, 28(4) (1980), pp. 459-464.

2. THEORETICAL DEVELOPMENT OF THE PRESENT-VALUE METHOD[2]

The present-value tax expenditure, P, of a contribution made at age M and withdrawn at age N is estimated using the following formula:

$$P = Ct_M + C[1-t_M(1+u)]\sum_{j=M+1}^{N}\frac{\left\{\prod_{k=M+1}^{j-1}[1+i(1-t_k(1+u))]\right\}it_j}{(1+\rho)^{j-M}} - \frac{C(1+i)^{N-M}t_N}{(1+\rho)^{N-M}} \qquad (1)$$

where C is the contribution, t is the marginal tax rate, u is the average provincial tax rate (expressed as a percentage of federal taxes for convenience), i is the nominal rate of return, ρ is the discount rate, and j and k are periods during which the contribution earns investment income. Note that P and C represent averages for a cohort of individuals of the same age. The first term in equation (1) is the tax forgone on the contribution, the second term represents the revenue that would have been collected on the investment income, and the last term is the revenue that is collected when the contribution and all investment income are withdrawn.[3] We assume that marginal tax rates vary with age. We also assume that any non-sheltered income is taxed as interest income. Later in the paper we relax the latter assumption.

We illustrate the calculation with the simple example shown in Table 1. Suppose that an individual makes a $100 contribution to a tax-assisted plan at age 50 and withdraws the $100 and any interest at age 55. To simplify matters, assume that the federal marginal tax rate is constant through time (that is, $t_M=t_j=t_N$) and equal to 25 per cent, that provincial taxes are 50 per cent of federal taxes, and that both the rate of return and the discount rate are equal to 6.4 per cent (we develop this rate later in the paper).

The top section of the table indicates what happens in a tax-assisted environment. The after-tax cost of the $100 contribution is $62.50, because the federal government provides a deduction worth $25 on the contribution while the provincial government forgoes an additional $12.50 in tax revenue. The $100 grows until the end of year five, when the entire amount is withdrawn, resulting in federal taxes of $34.09 and provincial taxes of $17.05.

The next section indicates what happens in a non-tax-assisted environment. The individual first has to pay $25 dollars in federal taxes and $12.50 in provincial taxes on the $100 of income available to be saved, meaning that only $62.50 is invested.[4]

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[2] An alternative approach to estimating the present-value tax expenditure is described in the Appendix.

[3] Note that in the first year after the investment is made (M+1), the product operator will be equal to 1 since $k > j-1$.

[4] Note that the after-tax cost to the individual is the same under both the tax-assisted and non-tax-assisted environments.

At the end of each year, the individual pays tax on the interest, but nothing on the withdrawal itself.

Table 1
Calculation of Present-Value Tax Expenditure

		Amounts ($)							
		Contribution	Year					Withdrawal	
		(Year 1)	1	2	3	4	5	(Year 5)	
TARS investment	Gross balance	62.50	106.40	113.21	120.46	128.16	136.37	136.37	
	Fed. tax paid (A)	-25.00						34.09	
	Prov. tax paid (C)	-12.50						17.05	
	Net balance	100.00	106.40	113.21	120.46	128.16	136.37	85.23	
Non-TARS investment	Gross balance	62.50	66.50	69.16	71.93	74.80	77.80		
	Fed. tax paid (B)		1.00	1.04	1.08	1.12	1.17		
	Prov. tax paid (D)		0.50	0.52	0.54	0.56	0.58		
	Net balance	62.50	65.00	67.60	70.30	73.12	76.04		
Federal tax loss (Tax paid B - Tax paid A)		25.00	1.00	1.04	1.08	1.12	1.17	-34.09	**Total present-value cost**
Federal present-value tax cost		25.00	0.94	0.92	0.90	0.88	0.86	-25.00	**4.49**
Provincial tax loss (Tax paid D - Tax paid C)		12.50	0.50	0.52	0.54	0.56	0.58	-17.05	
Provincial present-value tax cost		12.50	0.47	0.46	0.45	0.44	0.43	-12.50	**2.25**
								Total federal and provincial present-value cost:	**6.74**

The third and fourth sections of Table 1 show the tax cost to the federal government on a current- and present-value basis. In this example, the federal tax expenditure on a $100 contribution is $4.49 or $0.04 per dollar. The remainder of the table shows the tax expenditure for the province and the total for both levels of government. Notice that because the rate of return on the investment and the discount rate are equal, the revenue received from the future withdrawal exactly compensates for the tax lost on the contribution today. If the discount rate were less than the rate of return, the tax on the withdrawal would have a higher present value, leading to a *lower* tax expenditure.

These observations can also be seen by comparing the first and last terms in equation (1). When $t_M = t_N$ and $i=\rho$, that is, when the tax rates applicable to contributions and withdrawals are the same and when the interest rate and the discount rate are also equal, the terms cancel each other. As ρ decreases, the last term in equation (1) increases, but because this term is subtracted, the present value of the tax expenditure falls.

Table 2 illustrates how the tax expenditure varies with the length of time the contribution remains in the tax-assisted plan, N–M, using our simple example. The longer the period, the larger the tax expenditure.

Table 2
Change in Present-Value Tax Expenditure Over Time

N – M	Federal present-value tax expenditure (per dollar of contribution)
(years)	($)
5	0.04
10	0.08
20	0.15
30	0.21
40	0.25

Now we add a further dimension to the analysis. Because payouts from retirement savings plans are normally received in a stream of payments over the retirement period, it is necessary to allow for more than a single payout at age N. Therefore, the present-value tax expenditure of a given contribution will be the sum of several calculations of the type made in equation (1). For example, a $1 contribution is made at age 50, but 10 cents (plus the associated interest) is withdrawn every year for 10 years. More generally, there will be a distribution of withdrawals over time. In our model, we assume that the maximum age that a person can withdraw funds from a tax-assisted plan is 99. Algebraically, the calculation of the tax expenditure is as follows:

$$Q = \sum_{N=M+1}^{99} a_N P_N \qquad \sum_N a_N = 1 \qquad (2)$$

where Q is the tax expenditure for a contribution that is withdrawn over several periods, a_N is the proportion of the contribution made at age M that is paid out at age N, and P_N is the present-value cost of contributions made at age M and withdrawn at age N, as calculated in equation (1). We discuss how we calculate the factor a_N in the next section.

The last step is to aggregate the individual results. This is accomplished by weighting the results from equation (2) (Q_l) by the proportion of total contributions made in the year by individuals of different ages, c_l:

$$PVTE = \sum_{l=M_0}^{M^*} c_l Q_l \qquad \sum_l c_l = 1 \qquad (3)$$

where M_0 and M^* are the lowest and highest ages at which contributions can be made.

3. APPLYING THE PRESENT-VALUE METHOD

In calculating the present-value tax expenditure estimate, this paper follows the assumptions made in recent *Tax Expenditures and Evaluations* reports. First, the estimates are based on a broadly defined benchmark tax system, which uses nominal income as the tax base rather than real income. Second, the estimates are made assuming that there would be no change in savings or in the timing of withdrawals if the tax expenditure were removed. In other words, it is assumed that there is no behavioural change.

Although estimates are presented separately for RPP and RRSP programs[5] under the cash-flow method, we calculate only one estimate for these two programs under the present-value method. This is because the longitudinal tax return data we use in the development of the estimates does not separate RPP income from RRSP income.

We require several pieces of information to calculate the present-value tax expenditure.

First, we need information on the marginal tax rates on contributions and withdrawals.

Second, since there is a tax deferral on contributions made to a tax-assisted plan, we need to know how long a given contribution remains in such a plan (recall the factor a_N from equation (2) in the previous section). Therefore, a distribution by age of how the contribution is withdrawn from the plan over an individual's remaining lifetime is required.

Third, since the tax treatment of various forms of investment income varies, we need to know the investment portfolio of individuals in the absence of a TARS program. For example, capital gains and dividends are taxed at a lower rate than interest income.

Finally, we must make assumptions about the rate of return on contributions and the discount rate. The model assumes that both the rate of return and the discount rate are constant.

We provide further details below about how these pieces of information were obtained and what assumptions were made.

[5] Data on DPSPs are not available.

Calculating Federal Marginal Tax Rates

The T1 model has been used to generate average federal marginal tax rates by age and sex for both contributions and withdrawals at five-year age intervals. The tax rates used for 1998 are shown in Table 3, which indicates that the marginal tax rates on withdrawals are less than the rates on contributions.[6] These rates are consistent with those used to calculate the cash-flow estimate. Based on estimates of provincial tax revenues as a percentage of federal tax revenues, we assume that the provincial marginal tax rates are just over half of the federal tax rate.

Table 3
Average Federal Marginal Tax Rates, 1998

	Contributions		Withdrawals	
Age	Males	Females	Males	Females
		(%)		
19	17.4	16.9	7.3	10.8
20 - 24	21.5	19.3	17.8	14.6
25 - 29	25.4	23.8	22.8	20.9
30 - 34	27.4	25.2	25.5	21.6
35 - 39	28.2	25.9	24.9	22.1
40 - 44	28.3	25.8	25.3	22.2
45 - 49	27.8	25.2	24.3	20.5
50 - 54	27.6	24.7	23.3	19.6
55 - 59	27.1	24.2	22.3	19.0
60 - 64	26.7	23.5	21.8	18.4
65 - 69	29.3	27.3	21.8	18.6
70 - 74	22.6	19.4	21.6	19.0
75 - 79	29.3	19.4	21.4	19.2
80 - 84			19.4	18.3
85 - 89			16.7	15.8
90 - 99			15.2	11.7
Weighted average	27.5	25.0	21.9	18.9

The rates presented in Table 3 reflect the benefit reduction rates on federal income-tested programs that are part of the tax system, such as the Canada Child Tax Benefit, the goods and services tax credit, and Old Age Security repayments. A case could be made that the benefit reduction rates for the Guaranteed Income Supplement (GIS) should also be taken into account in the marginal tax rates, even though the GIS is not linked directly to the tax system. If the GIS benefit reduction rates were reflected in the marginal tax rates shown in Table 3, then the tax expenditure estimates under the present-value and cash-flow methods would be reduced. We are reviewing whether GIS effects should be taken into account when calculating TARS tax expenditures.

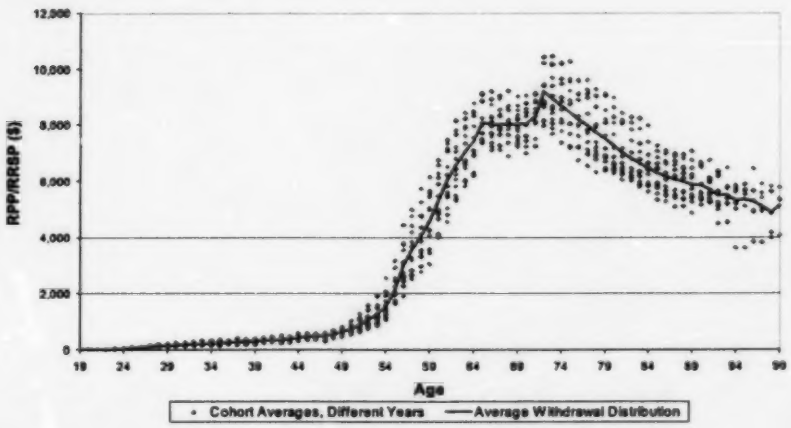
[6] The overall weighted average shown in Table 3 is based on the distributions of contributions and withdrawals.

Developing the Withdrawal Distribution

The empirical approach to develop the withdrawal distribution has four stages. First, an average RPP/RRSP income profile for a typical individual as he or she ages from 19 to 99 is derived using longitudinal tax return data.[7] Second, this profile is then modified to take into account the lifespan of the population as a whole. The third stage discounts the modified income distribution in order to obtain the withdrawal profile of contributions rather than a withdrawal profile of both contributions and investment income. The fourth stage adjusts this profile for individuals who are older than 19.

The first stage begins with longitudinal tax return data for the years 1985 to 1997.[8] Individuals are grouped by their age in 1985. Therefore, for each age level, there are 13 observations representing the total RPP/RRSP withdrawal made in each year from 1985 to 1997. For each observation, an age is assigned based on the 1985 age for that group of individuals. For instance, someone who was 20 in 1985 would be 21 in 1986 and 32 in 1997. This process is repeated for each age level in 1985. Therefore, for most age levels, there are multiple observations of income withdrawn from RPPs and RRSPs. The dollar values of RPP/RRSP income are converted into constant 1992 dollars. These observations are plotted on an X-Y graph with age on the X-axis and income on the Y-axis (Figure 2). An average of the income amounts for each age level is used to generate a lifetime RPP/RRSP income distribution for a typical individual (also shown in Figure 2). The average value for each age is then divided by the sum of all average values to obtain a percentage distribution. This distribution represents the withdrawal distribution for a 19-year-old individual who will live until 99 years of age.

Figure 2
Average RPP/RRSP Income (in Constant 1992 Dollars)
Based on Longitudinal Tax Return Data, 1985-1997



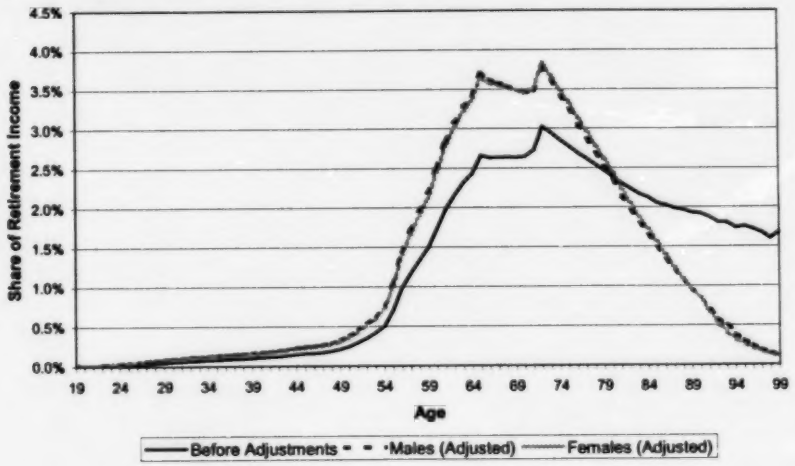
[7] As noted earlier, we assume that all contributions are taxed by age 99.

[8] The longitudinal data file has information on RPP/RRSP withdrawals only for the 1985-1997 period.

This distribution should be adjusted to take into account the probability that the individual will die before reaching the age of 99. Therefore, in the second stage, survival rates are calculated using mortality rates from Statistics Canada's *Vital Statistics Compendium*.[9] These survival rates are then modified to account for survivor benefits.[10]

The percentage distribution is then multiplied by the survival rates and adjusted so that the final withdrawal distribution adds to 100 per cent. We compare these adjusted distributions in Figure 3. These adjusted distributions indicate that 15 per cent of withdrawals are made before age 60, 65 per cent are made between ages 60 and 79, and 20 per cent are made at ages 80 and up.

Figure 3
Distribution of RPP/RRSP Income
Before and After Adjustment for Survival Rates



[9] Statistics Canada, Cat. No. 84-214, 1996. The survival rate is equal to 1 minus the mortality rate (expressed as a per cent). The probability of survival to a given age is the product of all previous survival rates. Survival rates are calculated separately for males and females. We also investigated the effect of higher-income individuals living longer. Based on 1991 data from Statistics Canada, we found that even though high-income people lived longer, the net effect on our preferred tax expenditure estimate was only 0.2 per cent.

[10] The survivor benefit is assumed to be 50 per cent of the contributor's benefit. Female spouses are assumed to be three years younger than male spouses. Therefore, the modified survival rate for a male would be calculated as $z \times p(m) + (1-z) \times [p(m) + (1-p(m)) \times p(f) \times 0.5]$, where $p(m)$ is the male survival rate, $p(f)$ is the female survival rate and z is the proportion of individuals who are not married, in this case 0.1. No adjustment needs to be made for spousal RRSPs since these are implicitly taken into account through the data.

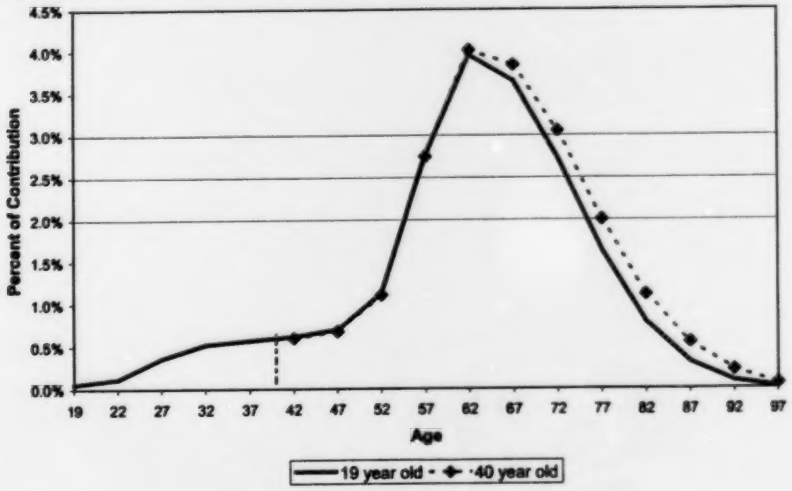
Since we need to know the length of time a contribution remains in an RPP or RRSP, the withdrawal distribution should indicate the proportion of contributions withdrawn, not the sum of both contributions and interest. However, we cannot observe the ratio of contributions to interest being withdrawn. Therefore, in the third stage the total income distribution is discounted assuming that the contribution was made when the individual was 19.[11] This distribution is shown by the solid line in Figure 4.

Up to this point, we have discussed a withdrawal distribution for a 19-year-old making a contribution. For contributions made by those over age 19, the distribution needs to be adjusted so that the entire contribution will be withdrawn. The concept is illustrated in Figure 4 for a 40-year-old making a contribution. The dashed line represents the distribution for a 40-year-old which is almost identical to the distribution for a 19-year-old up to age 62. The area under each of the lines is equal to 1. The new distribution is obtained as follows:

$$W_{40}(N) = \frac{W_{19}(N)}{\sum_{n=40}^{99} W_{19}(N)} \qquad (4)$$

where $W_{40}(N)$ is the probability of withdrawal at age N for a contribution made at age 40, and $W_{19}(N)$ is the probability of withdrawal at age N for a contribution made at age 19. Graphically, each point on the 19-year-old distribution is divided by the area under the distribution to the right of age 40, as shown in Figure 4.

Figure 4
Discounted Withdrawal Distributions

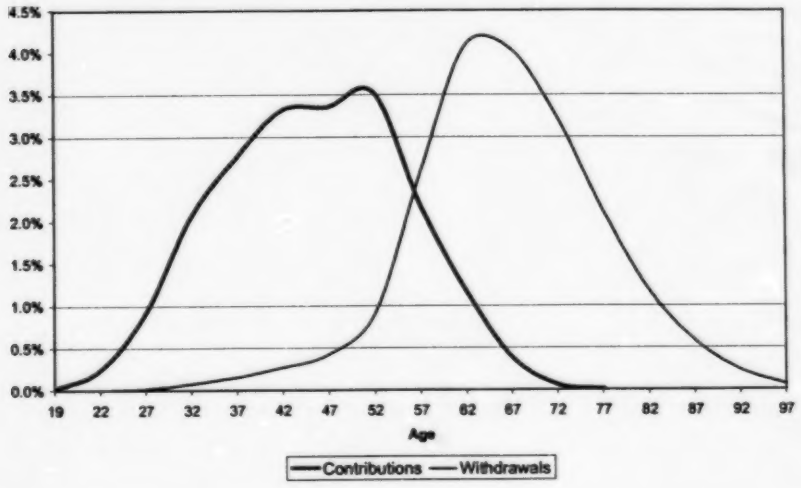


Note: The discount rate used is the real market rate of return (4.4 %). This rate is derived later in the text.

[11] The discount factor is adjusted for inflation (i.e. the real market rate of return is used).

By weighting the truncated distributions by the contribution profile, one can obtain a projected withdrawal distribution for the contribution profile made in a given year. This is shown in Figure 5 for 1997 contributions. This chart indicates the average length of time a contribution is held before it is withdrawn, which in this case is about 19 years.

Figure 5
Contributions and Projected Withdrawals



The empirical approach we use in this paper could be criticized because the withdrawals made today do not fully take into account the increase in both the use and generosity of TARS programs (in short, the pension system is not fully mature). One could argue that because the increased generosity and use of the program will lead to higher withdrawal amounts (in real terms) for those retiring in the future, the share of the total withdrawals occurring in retirement will increase in the future. However, while the amounts withdrawn will increase for those in retirement, it is also possible that the amounts withdrawn before retirement will increase proportionately, meaning that there will be no change in the shares of retirement income withdrawn at a given age. The arguments are illustrated in Figure 6. Distribution A represents the level of withdrawals currently observed. Distribution C presents the first argument, where only withdrawals in retirement increase, thereby changing the shares for each age. Distribution B is simply an upward shift of distribution A, meaning that the shares of retirement income withdrawn at a given age remain the same.

We checked our distribution by comparing the distribution of 1985 with that of 1997 (Figure 7). We found that there was little change in the withdrawal distribution between these two years, leading us to believe that despite the changes in the TARS programs and their use, the age distribution of withdrawals will remain relatively constant in the future.

As a final point, it should be noted that in a non-tax-assisted environment, the discounted withdrawal profile may be different as individuals respond to the differences in tax treatment of various investments. However, since we are assuming no behavioural change between tax-sheltered and non-sheltered investments, it is assumed that the withdrawal distribution is the same for non-tax-assisted investments as it is for tax-assisted investments.

Figure 6
Level of Withdrawals From RPPs and RRSPs

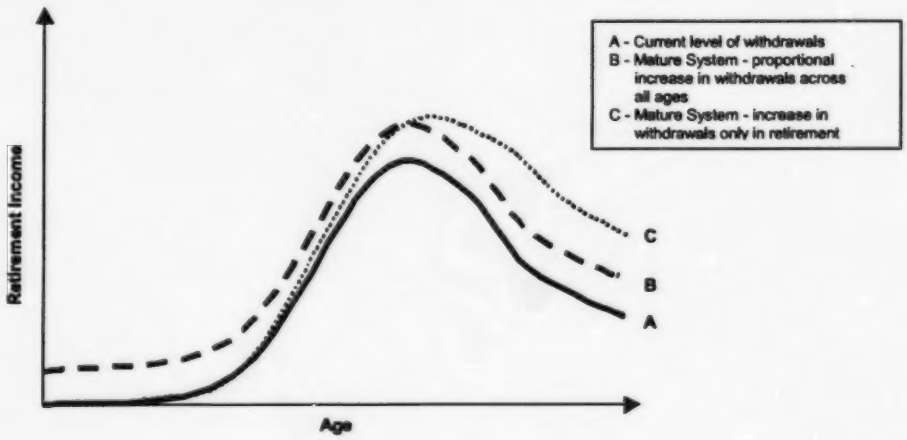
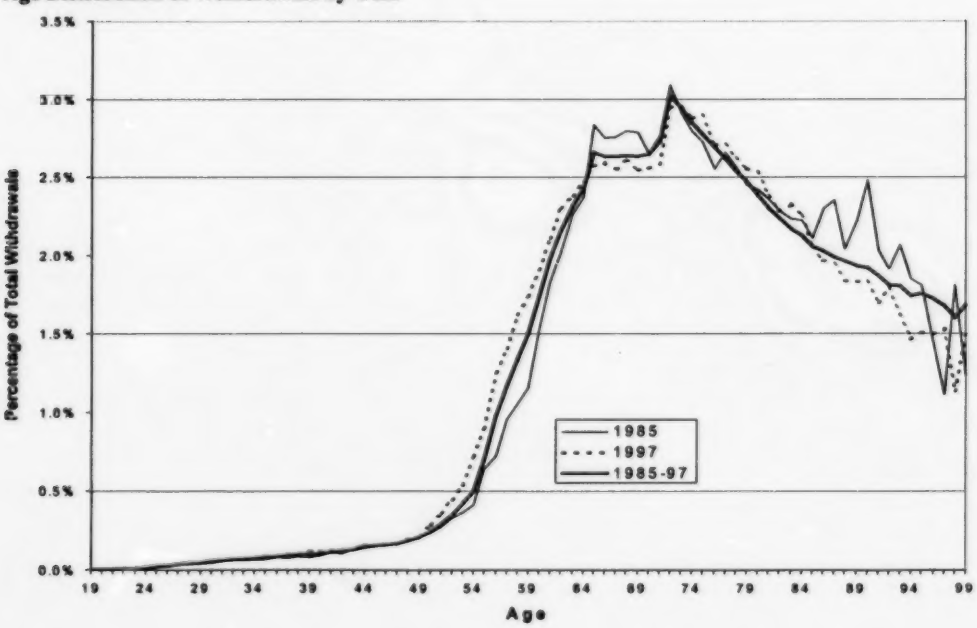

A - Current level of withdrawals
B - Mature System - proportional increase in withdrawals across all ages
C - Mature System - increase in withdrawals only in retirement
Retirement Income
Age
C
B
A

Figure 7
Age Distribution of Withdrawals by Year



Developing the Investment Portfolio

As mentioned earlier, different investments receive different tax treatment. Interest income from bonds, Treasury bills, and guaranteed investment certificates is taxed the same as employment income. Meanwhile, capital gains are treated favourably in two ways. First, they are taxed only upon realization, creating a tax deferral. Second, capital gains are not fully taxed.[12] In addition, the effective tax rate on dividend income is reduced at the personal level by the dividend gross-up and tax credit.

In accordance with the standard approach for estimating tax expenditures, the alternative portfolio should not take into account any behavioural changes. Therefore, we assume that individuals invest in exactly the same instruments that they currently invest in through their RPPs or RRSPs. A more realistic approach would allow for investment in owner-occupied housing (such as paying down a mortgage). However, this would imply a behavioural change. If investment in housing were included in the model, the tax expenditure would be lower because owner-occupied housing benefits from the non-taxation of capital gains and the non-taxation of imputed rents.

Data to develop the portfolio are taken from Statistics Canada's *Trusteed Pension Funds* and *Pension Plans in Canada*.[13] Stock data are used to determine the proportion of the portfolio in different types of investments. To be useful for estimating the present-value tax expenditure of TARS programs, these investments need to be classified between interest-bearing and equity-type assets (capital-gain-bearing or dividend-bearing). For trusteed RPPs (Table 4), mutual and investment funds, equities and real estate are assumed to produce capital gains or dividends, while the remaining items are interest-bearing. For RRSPs (Table 5), only investment funds are assumed to produce capital gains or dividends, while investments held by the financial institutions are assumed to be interest-bearing. In addition, the assets in non-trusteed public employee pension plans and insurance plans are assumed to be interest-bearing. Taken together, the average portfolio of all of the above plans is 67.9 per cent interest-bearing and 32.1 per cent equity.

To determine the proportion of dividend and capital gain income for equity investments, we can use the ratio of the Toronto Stock Exchange (TSE) 300 return to the "total return" on the TSE 300, which represents the combined return from dividends and the index. The ratio for the 1956-1999 period was 41 per cent capital gains and 59 per cent dividends.

[12] The inclusion rate was reduced from three-quarters to two-thirds as of February 28, 2000, and was further reduced to one-half as of October 18, 2000. For simplicity, the inclusion rate for 2000 is assumed to be two-thirds when calculating the tax expenditure estimate.

[13] Statistics Canada, Catalogues No. 74-201 and 74-401 respectively.

Table 4
Book Value of Assets in Trusteed RPPs

	Percentage of gross assets				
	1992	1993	1994	1996	Average
Pooled, mutual and investment funds	7.3	7.9	12.4	19.6	11.8
Equities	44.2	32.9	32.9	34	36.0
Bonds	32.6	42.2	39.6	33.1	36.9
Mortgages	3.2	2.8	2.6	1.9	2.6
Real estate	3.5	3.3	3.5	3.2	3.4
Cash and short-term deposits	7	8.6	6.9	6.3	7.2
Miscellaneous assets	2.3	2.3	2.1	1.8	2.1

Note: Percentages may not add to 100 due to rounding.

Source: Statistics Canada, *Trusteed Pension Plans,* Cat. No. 74-201.

Table 5
Accumulated Assets Held in RRSPs

	Percentage of total assets						
Money held by:	1992	1993	1994	1995	1996	1997	Average
Trust companies	11.7	11.8	9	7.9	6.9	4.5	8.6
Credit unions	11.2	11.2	11.6	11.7	11.1	10.2	11.2
Chartered banks	33.8	33.2	32.3	34	31	26.3	31.8
Other deposit taking intermediaries	0.5	0.5	0.4	0.4	0.3	0.1	0.4
Investment (mutual) funds	22.9	23.1	27.5	28.9	33.9	42.1	29.7
Insurance companies	19.9	20	19.2	17.2	16.9	16.7	18.3

Note: Percentages may not add to 100 due to rounding.

Sources: Statistics Canada, *Trusteed Pension Plans,* (Cat. No. 74-201), and *Pension Plans in Canada,* (Cat. 74-401).

We also have to make an assumption regarding the length of time a capital gain is held before it is realized. Our base case will rely on U.S. data that suggest that the average holding period is about 6.3 years.[14] To test the sensitivity of the results, we also use 10 years as the holding period.

Therefore, the base-case portfolio used in the analysis will have the following characteristics:

- 67.9 per cent interest-bearing and 32.1 per cent equity;
- equity returns are 41 per cent capital gains and 59 per cent dividends; and
- capital gains are realized every 6.3 years until withdrawn.

[14] This value is for corporate stocks. Unfortunately, only U.S. data were available. See Leonard E. Burman and Peter D. Ricoy, "Capital Gains and the People Who Realize Them," *National Tax Journal*, L(3) (1997), pp. 427-451.

Choosing the Rate of Return and the Discount Rate

There are two perspectives that we can take regarding the discount rate. The first is to take a "social approach." This approach attempts to take into account the impact on social welfare of TARS programs. Since tax expenditures can be interpreted as a form of government spending, we can turn to the cost-benefit analysis literature on public spending for some insight regarding the appropriate discount rate. Economic theory defines a range of plausible values.[15] Essentially, one can regard public sector spending as a reallocation of resources from the private sector to the public sector. That is, the tax expenditure is financed through higher taxes. These private sector resources could have been used for either consumption or investment. If the resources were used only for investment, the appropriate discount rate is the marginal rate of transformation (MRT), which is equal to the rate of return before all corporate and personal income taxes. If the resources were used for consumption, then the discount rate should be the marginal rate of substitution (MRS), which is the after-tax rate of return to individuals.[16]

In general, the resources are reallocated from both consumption and investment, so the discount rate should be between the MRS and the MRT. One possibility is to use the after-corporate, before-personal-income-tax rate of return. This is more generally referred to as the before-tax rate of return earned on bonds and other forms of investment. This rate is both well known and within the range dictated by economic theory. Using the pre-tax portfolio rate of return also has some intuitive appeal. In Section 2 we point out that when the rate of return and the discount rate are equal, the taxes received on withdrawal have the same present value as the cost of the deduction for the contribution.

The second perspective is the "financial approach." This perspective considers how much it costs the Government, in terms of lost revenue, to provide TARS programs. In this case, the discount rate would be the Government's cost of borrowing – the pre-tax long-term government bond rate. The financial approach is consistent with the way we measure other tax expenditures. Note that using this rate will lead to a lower tax expenditure. While we present results using both rates in the next section, we will report the estimates using only the financial approach in the future.

[15] An excellent discussion on the choice of a discount rate is contained in Richard W. Tresch, *Public Finance: A Normative Theory* (Plano, Texas: Business Publications, 1981).

[16] In a world with no taxes, the MRT would be equal to the MRS.

We estimated the rate of return on our portfolios based on data for the 1956-1999 period. The estimate is a weighted average of the long-term government bond rate, the long-term corporate bond rate and the total return on the TSE 300.[17] We calculated the real return on the portfolio to be 4.4 per cent and the average real government bond rate to be 3.5 per cent.[18] Assuming that inflation is 2 per cent, the nominal rates are 6.4 per cent on the portfolio and 5.5 per cent on long-term government bonds.

4. Estimates and Projections of the Federal Tax Expenditure

Table 6 presents the estimates of the present-value tax expenditure for 1998 using various portfolio alternatives. These results are calculated using the long-term government bond rate as the discount rate. This table highlights the effect of the different tax treatments for different types of returns. If the non-tax-assisted portfolio consisted entirely of interest-bearing assets, then the tax expenditure would be $8 billion, or $0.19 per dollar of contributions.[19] If the portfolio consisted of only dividend-bearing assets, the tax expenditure would be $4.7 billion, or $0.11 per dollar of contributions. If the portfolio were the base case defined in Section 3, then the tax expenditure would be $7.1 billion, or $0.17 per dollar of contributions. The results shown in Table 6 also indicate that the tax expenditure estimate is not very sensitive to the capital gains holding period.[20] This is because of the low weight given to equity in the portfolio.

Table 6
1998 Present-Value Tax Expenditure Estimates for Various Portfolios (Using Government Bond Rate as the Discount Rate)

	Gross tax expenditure	Tax expenditure per dollar of contributions
	($ billions)	($)
100% interest	8.0	0.19
100% capital gains (6.3-year rollover)	6.1	0.15
100% capital gains (10-year rollover)	5.8	0.14
100% dividends	4.7	0.11
Base case portfolio	7.2	0.17

[17] The weights used are based on the RPP/RRSP portfolio. The interest-bearing component was assumed to be 80 per cent government bonds and 20 per cent corporate bonds, which corresponds to the relative shares of total bonds in the National Accounts (personal sector). The TSE 300 total return, which represents the combined return on the index and dividends, was used for the equity portion of the portfolio.

[18] The real rate on corporate bonds averaged 4.4 per cent while the total real return on the TSE averaged 5.8 per cent.

[19] Based on total RPP/RRSP contributions of $41.6 billion in 1998.

[20] In the weighted RPP/RRSP portfolio, the difference in the estimate is 0.6 per cent. If the capital gain is held for the entire period that a contribution remains in an RPP or RRSP, we estimate that the tax expenditure will fall by 3.1 per cent.

If the market rate of return (6.4 per cent) were used as the discount rate rather than the long-term government bond rate (5.5 per cent), the estimate for the portfolio would rise from $7.1 billion to $8.2 billion. Thus, the tax expenditure estimate would rise from $0.17 per dollar of contributions to $0.20 per dollar of contributions.

Table 7 provides both present-value and cash-flow estimates for the years 1996 to 1998 and projections for the years 1999 to 2003.[21] The two approaches use different definitions of the TARS tax expenditure and therefore differ in both level and trend. The present-value tax expenditure per dollar of contributions falls from $0.17 in 1998 to $0.14 in 2001. This reflects the fall in marginal tax rates projected for this period because of the measures contained in the 2000 budget and the October 2000 *Economic Statement and Budget Update*. The cash-flow estimates peak at $0.38 per dollar of contributions in 1999, largely due to an interest rate spike in that year. They fall sharply to $0.30 per dollar in 2001, reflecting both the fall in tax rates and a rise in withdrawals relative to contributions.

Table 7
Tax Expenditure Estimates and Projections, 1996-2003

			Present-value estimates		Cash-flow estimates	
	Year	Total contributions	Gross tax expenditure	Tax expenditure per dollar	Gross tax expenditure	Tax expenditure per dollar
		($ billions)	($ billions)	($)	($ billions)	($)
Estimates	1996	43.4	7.4	0.17	14.8	0.34
	1997	44.9	7.6	0.17	15.2	0.34
	1998	41.6	7.1	0.17	13.6	0.33
Projections	1999	43.4	7.2	0.17	16.4	0.38
	2000	45.4	7.3	0.16	14.2	0.31
	2001	47.6	6.9	0.14	14.1	0.30
	2002	49.9	7.2	0.14	14.3	0.29
	2003	52.3	7.5	0.14	14.4	0.28

If parameters such as tax rates and interest rates are constant in the future, the present-value estimate per dollar of contributions will remain relatively stable, while the cash-flow estimate will decline over time as the pension and RRSP system matures and members of the baby boom generation begin to draw down their savings. The results in Table 7 point towards this trend since the cash-flow estimate per dollar of contributions falls between 2001 and 2003 while the present-value estimate remains constant.

[21] In this table we use the long-term government bond rate as the discount rate for the present-value estimates.

5. CONCLUSION

This paper describes the various issues involved in developing a present-value tax expenditure estimate for TARS programs. The key issues in this process are the choice of the discount rate and the development of a withdrawal distribution and investment portfolio. We have used an empirical approach in the development of both the withdrawal distribution and investment portfolio. Based on the analysis in Section 3, we have chosen the long-term government bond rate to be the discount rate used to calculate the estimates.

The present-value estimates complement the cash-flow estimates currently published by the Department. The cash-flow method gives estimates of the net revenue cost of providing a deduction on current-year contributions, not taxing the current-year investment income earned by past contributions, and taxing current-year withdrawals. The present-value method estimates the present value of taxes forgone today and in the future as a result of contributions made in a given year. Each measure has its advantages, and together, the cash-flow and present-value estimates provide more information on the revenue cost of tax-assisted retirement savings programs than was available previously.

APPENDIX: ALTERNATIVE APPROACH TO ESTIMATING THE PRESENT-VALUE TAX EXPENDITURE

In the main text we use a method that focuses on the tax cost to the Government over time (the "tax-cost" method). This section describes another approach that has been used in the literature to obtain a present-value tax expenditure estimate of TARS: the "benefit" method. This approach views the problem from the perspective of the individual. It assumes that the present value of the net proceeds to the individual is equal to the present value of the costs to the Government. But this is only true when the rate of return and the discount rate are equal. Therefore, this method can be used only if the discount rate is the same as the rate of return.[22] We illustrate this method with an example similar to that used to describe the method in the main text (that is, we assume that marginal tax rates vary with age, the rate of return is constant and any non-sheltered income is taxed as interest income).

The net proceeds in a future year of saving a dollar in a tax-assisted plan from age M to age N are given by:

$$NP_{TA} = C(1+i)^{N-M}(1-t_N) \qquad \textbf{(A1)}$$

where NP_{TA} is the net (or after-tax) proceeds of tax-assisted saving, C is the amount saved in pre-tax dollars, i is the nominal rate of return, M and N are the ages when the contribution is made and withdrawn (with interest) respectively, and t_N is the marginal tax rate at the time of withdrawal. The factor $(1+i)^{N-M}$ indicates that no tax is paid on investment income as it accrues in the plan. The factor $(1-t_N)$ indicates that the gross proceeds are subject to tax when withdrawn from the plan in year N.

In contrast, the net proceeds in a future year of saving the after-tax amount from one dollar of pre-tax income in a non-tax-assisted investment are given by:

$$NP_{NTA} = C(1-t_M)\prod_{j=M+1}^{N}[1+i(1-t_j)] \qquad \textbf{(A2)}$$

where NP_{NTA} is the net proceeds of non-tax-assisted saving. Here, the factor $C(1-t_M)$ indicates that only after-tax dollars are being saved. The product term indicates that investment income is subject to tax each year.

[22] At the end of this appendix we show that the two methods are equivalent when the rate of return is equal to the discount rate.

The future net benefit to the contributor of saving in a tax-assisted plan is given by the difference between the tax-assisted proceeds and the non-tax-assisted proceeds. This net benefit is equal to the loss in tax revenue for the Government (in future dollars).

$$\textit{Net Benefit to Individual} = \textit{Loss in Tax Revenue} = NP_{TA} - NP_{NTA} \qquad \textbf{(A3)}$$

To arrive at the tax expenditure in current dollars (that is, when the contribution is made), the future loss in tax revenue must be discounted by the factor $1/(1-\rho)$, where ρ is the discount rate.

Therefore, substituting equations (A1) and (A2) into (A3) and discounting yields:

$$P' = \frac{C(1+i)^{N-M}(1-t_N) - C(1-t_M)\prod_{j=M+1}^{N}[1+i(1-t_j)]}{(1+\rho)^{N-M}} \qquad \textbf{(A4)}$$

where P' is the present-value tax expenditure using this approach.

Let us illustrate the calculation with a simple example. Suppose that an individual makes a $1 contribution to a tax-assisted plan at age 50 and withdraws the dollar and any interest at age 55. To simplify matters, we assume that the federal marginal tax rate is constant through time (that is, $t_M=t_j=t_N$) and equal to 25 per cent.[23] We use a 6.4 per cent yield on plan funds. Therefore, the net proceeds from the tax-assisted plan will be:

$$NP_{TA} = \$1(1.064)^5(0.75) = \$1.02 \qquad \textbf{(A5)}$$

If the identical investment were made in a non-tax-assisted investment, the net proceeds would be:

$$NP_{NTA} = \$1(0.75)(1+0.064(0.75))^5 = \$0.95 \qquad \textbf{(A6)}$$

If we use the rate of return on plan funds as the discount rate, then the present-value tax expenditure is:

$$P' = \frac{(\$1.02 - \$0.95)}{1.36} = \$0.05 \qquad \textbf{(A7)}$$

In other words, under these assumptions, $1 invested today in a retirement savings plan will be worth $0.07 ($1.02-$0.95) more after five years than if it had been invested in a non-tax-assisted instrument. This difference is equal to the lost tax revenue for the

[23] Note that when the marginal tax rate is constant, the product term in equations (A2) and (A4) is replaced by the term $(1+i(1-t))^{N-M}$.

Government. Therefore, the discounted present value of the tax expenditure associated with this benefit to the individual is $0.05 of each dollar contributed to a retirement savings plan. This is the same result as that in the example in Section 2 of the main text.

Equivalence to the Method Used in the Main Text

If we assume that the rate of return is equal to the discount rate and that the marginal tax rate is constant, then the present-value tax expenditure formulas for the two methods are as follows:

$$\textit{Benefit Method}: P_{BM} = \frac{C(1-t)}{(1+r)^{N-M}}\left[(1+r)^{N-M} - (1+r(1-t))^{N-M}\right] \qquad \textbf{(A8)}$$

$$\textit{Tax Cost Method}: P_{TCM} = C(1-t)rt \sum_{j=M+1}^{N} \frac{(1+r(1-t))^{j-M-1}}{(1+r)^{j-M}} \qquad \textbf{(A9)}$$

If we multiply equation (A9) by $(1+r)^{N-M}/(1+r)^{N-M}$, we obtain:

$$\begin{aligned} P_{TCM} &= \frac{C(1-t)}{(1+r)^{N-M}} rt \sum_{j=M+1}^{N} \frac{(1+r(1-t))^{j-M-1}(1+r)^{N-M}}{(1+r)^{j-M}} \\ &= \frac{C(1-t)}{(1+r)^{N-M}} rt \sum_{j=M+1}^{N} (1+r(1-t))^{j-M-1}(1+r)^{N-j} \end{aligned} \qquad \textbf{(A10)}$$

Comparing equations (A8) and (A10) we can cancel the $C(1-t)/(1+r)^{N-M}$ term. Therefore we need to show that:

$$\left[(1+r)^{N-M} - (1+r(1-t))^{N-M}\right] \stackrel{?}{=} rt \sum_{j=M+1}^{N} (1+r(1-t))^{j-M-1}(1+r)^{N-j} \qquad \textbf{(A11)}$$

By noting that the right-hand side of equation (A11) resembles a geometric series of the form $\sum ap^{\alpha}q^{\beta}$ where α is increasing and β is decreasing we can show that the right-hand side simplifies to:

$$\begin{aligned} RHS &= \frac{rt\left[(1+r)^{N-M} - (1+r(1-t)^{N-M}\right]}{(1+r)-(1+r(1-t))} \\ &= \frac{rt\left[(1+r)^{N-M} - (1+r(1-t)^{N-M}\right]}{r(1-(1-t))} \\ &= \frac{t\left[(1+r)^{N-M} - (1+r(1-t)^{N-M}\right]}{t} \\ &= (1+r)^{N-M} - (1+r(1-t))^{N-M} \\ &= LHS \end{aligned} \qquad \textbf{(A12)}$$